FAQ Meltio M600 Launch

Which Materials can be printed by the Meltio M600?

The Meltio M600 can process the complete range of current meltio materials along with additional copper and aluminum alloys.

For copper alloys Meltio has begun working with the following materials:

ERCuNiAl: Bronze for marine applications that is fully printable and speeds comparable to stainless steel.

CuCrZr: Copper Chromium Zirconium alloy used for its excellent conductivity and mechanical properties. This material is currently printable for structures that have thin walls and high aspect ratios such as Heat Exchangers, however further work needs to be done for parameterization.

In regards to Aluminium alloys, we have been working with both *5000 Series* and *6000 Series* alloys which are printable and have produced fully dense results, however the surface finish and ability to reproduce small features is not fully developed yet, meaning that parts can be produced but their appearance is below the standard that we see for most meltio parts.

What is the deposition Rate of your machines ?

The Meltio M600 is approximately 60% more productive than current Meltio technology. However we do not like the metric of Deposition rate as it varies drastically depending on the geometry, properties and material of the parts that are printed.

We feel that Deposition rate is a concept that is understood differently by different actors in the industry (Just deposition, Bad properties at high deposition rates, simple geometries, no cooldown time).
We therefore prefer the metric of Productivity / Duty Cycle.

Based on our mix of parts and materials we have produced over the past year we have achieved a productivity of approximately 3200kg / Year with relatively loose production planning and without tending the machine on weekends.

How do we achieve such a high productivity with only 1kW of laser power ?

The M600 is a production machine that can work fully unattended for large periods of time which is a significant improvement over systems that are commonly found in the market.

We have produced parts with print times over over 2 weeks fully unattended.

Print cost per hour ?

Machine amortization is always depending on how the users calculate their overhead. However, using the MIT-developed Cost Model with an assumption of 7 years machine lifetime, considering an average setup, we can calculate an hourly cost for the machine use, without consumables, of:

- 6.32 € / 6.91 USD

The low value is largely influenced by the superior reliability of the system that allows for unattended operation with an expected uptime of 80%.

Print cost per Volume ?

Assigning a cost per volume could be misleading as several factors define the printing time and therefore the consumption of Argon gas and power. However, the wire cost is generally the main driver of Variable Print Cost, its weight in the calculation largely depending on the relevant price per unit of mass.
A very rough indication of the cost per unit of volume, from lowest to highest, could be as following:
Mild Steel: 0.18 €/cm^2
Ti64: 0.52 €/cm^2

What is the Cost for inerting of chamber on the M600 :

To fully Inertize the chamber to 50 ppm of O_2 concentration, the Meltio M600 requires 8 cubic meters of Argon. The inertization process takes approximately two hours to complete and costs between 30 and 40 euros based on standard gas pricing for most developed countries. And significantly less if you have a liquified system (5-10 Euros).

In case you are still looking for a gas supplier please reach out to us, our partner Air Liquide offers preferential pricing to meltio customers in a variety of countries.

Maintenance / Running Cost :

As the M600 is designed for frequent use we have put a big focus on improving the lifetime of the consumables as well as reducing their cost. The wire nozzles for the M600 last approximately twice as long and cost half as much for example. This story is repeated on all consumables.

And lastly for extra peace of mind we offer deposition head refurbishments with a cost structure that is based on how many hours the machine has been used, meaning that if something fails before its nominal lifetime it will not break your cost model, and laser degradation is capped at less than 1 Euro per hour in case of failure.

How much time does it take to turn the printer around for another part ?

Build plate exchanges and basic cleaning and maintenance takes about 15 minutes.

For production workflows using the zero point clamping system the machine can be turned around in less than 1 minute considering a 15 minutes of daily downtime for maintenance. In addition to saving the set up time for post processing (CNC, EDM).

How long does it take to load material into the printer ?

Loading a new spool of material or connecting an external wire drum takes approximately 5 minutes of operator time.

Why do you offer the ability to print more than 2 materials ?

Offering 4 Materials allows for more flexibility on the customer side. First off, offering more than two materials allows you to print bimetallic parts with a dedicated support/Raft material. But a third material can also serve as an interface material between two non compatible materials. Lastly the ability to have 4 materials loaded in the machine at any given time allows

How long does it take to exchange the material within the print ?

Automated wire changes make use of the Built in Wire Cutter for maximum reliability and take approximately 20 seconds to complete.

How do I connect a large wire drum to the machine ?

Connecting Wire Drums to the printer is easy thanks to the “External Wire Drum Kit” that includes all the parts to connect bulk material sources to the M600. The kit contains a roller wire guide for extra smooth and reliable feeding.

What is the heaviest part you can print ?

The Meltio M600 can print parts in excess of 100 kg of deposited weight. The recommended maximum weight of the part + build plate is 150kg.

How much larger is the build volume compared to the M450 ?

The Meltio M600`s Workspace is 6.2 times larger than that of the Meltio M450.

Why is this printer more repeatable than others ?

The Meltio M600 is more reliable and repeatable than machines in its class because it fuses the process knowledge that we have gained from installing over 300 Laser Wire DED Machines with a really stable motion platform powered by servo motors and linear encoders.

The M600 leaves the factory fully calibrated, it removes operator touchpoints such as laser calibration for more stability and features a variety of sensors for process monitoring and an improved process control system.

What is the benefit of Blue lasers ?

Blue lasers (450 nm) are beneficial for the processing of most materials as the shorter wavelength is absorbed more by most metals and particularly by Aluminium and Copper where blue light is absorbed over 10X more compared to most industrial lasers operating in the Near infrared wavelength range of 950-1100 nm,

This increase in absorption is directly contributing to the energy efficiency of the system as less energy is lost due to reflection. This is how the Meltio M600 prints significantly faster than the previous meltio products while the actual laser power is reduced. It also means that the production process is more environmentally friendly and your energy bill is lower as well.

What is the lifetime of the Blue lasers ?

The Median lifetime of the Blue laser deposition head is 20.000h when operated at full power at all times. Thanks to the refurbishment options for the deposition head the cost of laser degradation is effectively managed as users can replace their head with a refurbished unit at a low cost. Note: Lifetime is defined as the period of time at at the end of which the lasers only produce 80% of their nominal output.

Does the M600 use laser fibers ?

No, the Meltio M600 is the first Meltio product that integrates the lasers directly into its deposition head. Not only does this make the system more robust, it also increases the efficiency of the laser system as fiber coupling losses (i.e. energy that is generated but does not enter the laser fiber) are removed. It also means that the laser head is its own self-contained subassembly for easy servicing.

How do you service the Blue laser head ?

The Blue laser head of the Meltio M600 is designed to be easily served by the end users for the replacement of common wear parts such as nozzles and coverglasses.
If a serious fault occurs and the deposition head needs to be returned to Meltio, we offer a new “Refurbishment” service which means you will receive a fully refurbished deposition head right away, and only return your head once the new head is installed. The service is offered at a low price to the end user to ensure the system has a long lifetime with low maintenance costs. It is also a testament to our confidence in the new print head as no serious faults have been detected in over a year of testing.

Can I resume a print after it failed, ran out of material or the lights went out ?

Yes, the Meltio M600 makes it easy to resume a print if anything goes wrong. Thanks to the absolute encoders the last position is saved and the printer on resume the printer returns to these coordinates to continue printing. Even if you open the door and move the print bed around