ONE CLICK METAL

3D Printing Series Production in Machine Manufacturing:

Functionality and Cost Efficiency through Additive Metal Manufacturing

THE APPLICATION

The driver is an important component in the BOLDseries and takes over the function of opening and closing the cartridges filled with powder.

With the the cartridge system, a clean and convenient material handling can take place and the health of your employees can be protected in the best possible way. With the requirement for easy assembly and safe transfer of torque from the machine to the cartridges, the requirements for the design and the manufacturing process are set.

PRINTING vs. MACHINING

Additive metal manufacturing ensures both cost and material effectiveness while providing industrial-grade component quality for long-term use.

Due to the limited space in the assembly area and the specifications of the motor manufacturer, only a feather key can be used for power transmission. Either the keyway must be created by pushing or broaching, or the feather key is also milled into the component.

Conventionally manufactured, with a batch size of 150 pieces, the cost of the individual driver is 21.45€. With a batch size of 500, the cost could be reduced to 15.26€ per component. A further reduction in costs only occurs with significantly larger quantities.

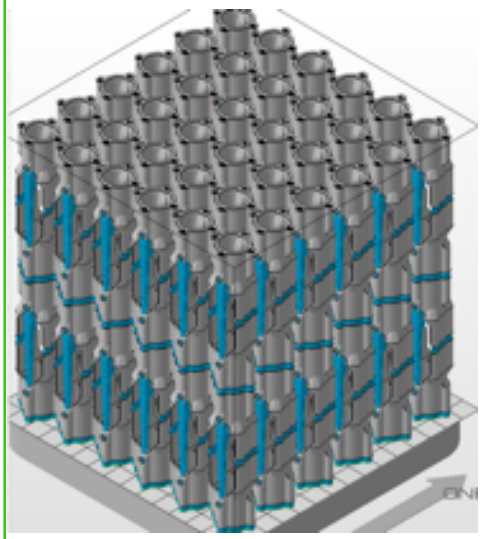
If the Laser Powder Bed Fusion process is chosen and several parts are placed on one build plate (batch production), the cost is €11.05 with 144 parts per batch.

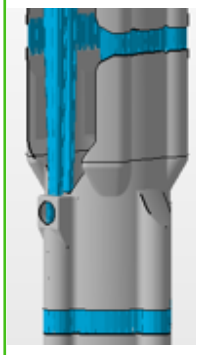
But how do you get 144 drivers onto one build plate? For this we consider the method of stacking.

STACKING METHOD

Stacking enables the use of the full build volume and thus manufacturing with increased productivity.

With the Laser Powder Bed Fusion Process, it is necessary to connect or weld the components to the build plate. This means that it is not possible to use the full build volume without further ado. The stacking method helps to solve this problem and allows us to use the full build space by using a suitable design as well as a clever placement of the components. That saves us non-productive time and we are able to manufacture more productively.





STACKING OF THE DRIVER

By stacking the driver, 144 drivers can be manufactured within one build job

When designing the part, care was taken to ensure that this can be stacked in the build plate without causing a high support effort. Specifically, the part is always placed on top of each other rotated by 180°. This results in a pair of surfaces that can be easily supported.

The top of the part is tapered so the next part can be tied with very few supports. Towards the bottom, the next part is also tied with a small support surface.

TECHNOLOGY COMPARSION

Conventional subtractive milling or additive manufacturing? This question must already be asked during the design phase.

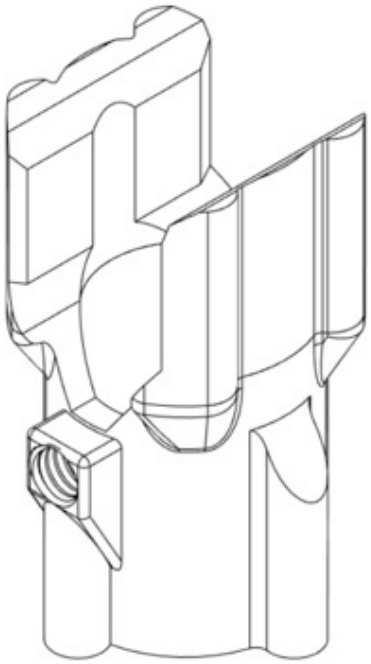
Due to the requirements on the driver and the design limits in the classic milling process, manufacturing with the laser powder bed fusion process is the obvious choice.

Cost saving

48%

Weight Reduction

52%



BOLDseries Metal 3D Printer

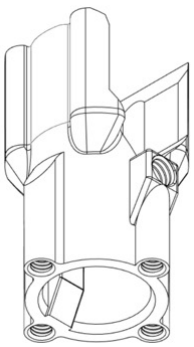
Technology	Laser Powder Bed Fusion
Material Type	1.4404/316L
Part mass	25g
Fabrication time (per part)	25min (batch: 60,3h)
Cost per part	11,05€

Milling

Technology	CNC machining from solid metal block
Material Type	1.4404/316L
Part mass	52g
Lead time	6 days
Cost per part	21,45€

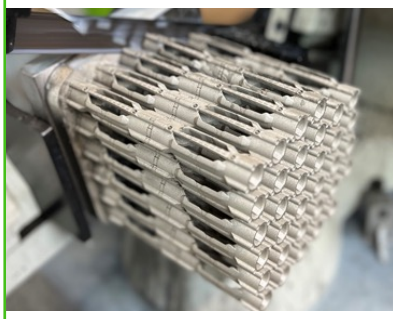
Part Requirements

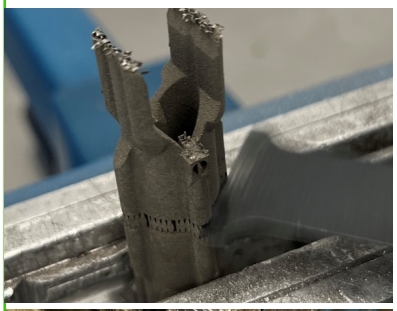
- High stiffness to assure angular precission
- Compact connection to shaft
- Mid volume production capable

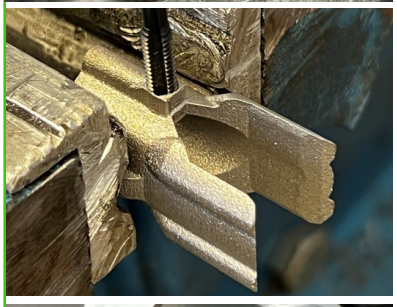


POST PROCESSING

After the build job was printed with the stack of drivers, the supports must be removed and post processed before they can be mounted.







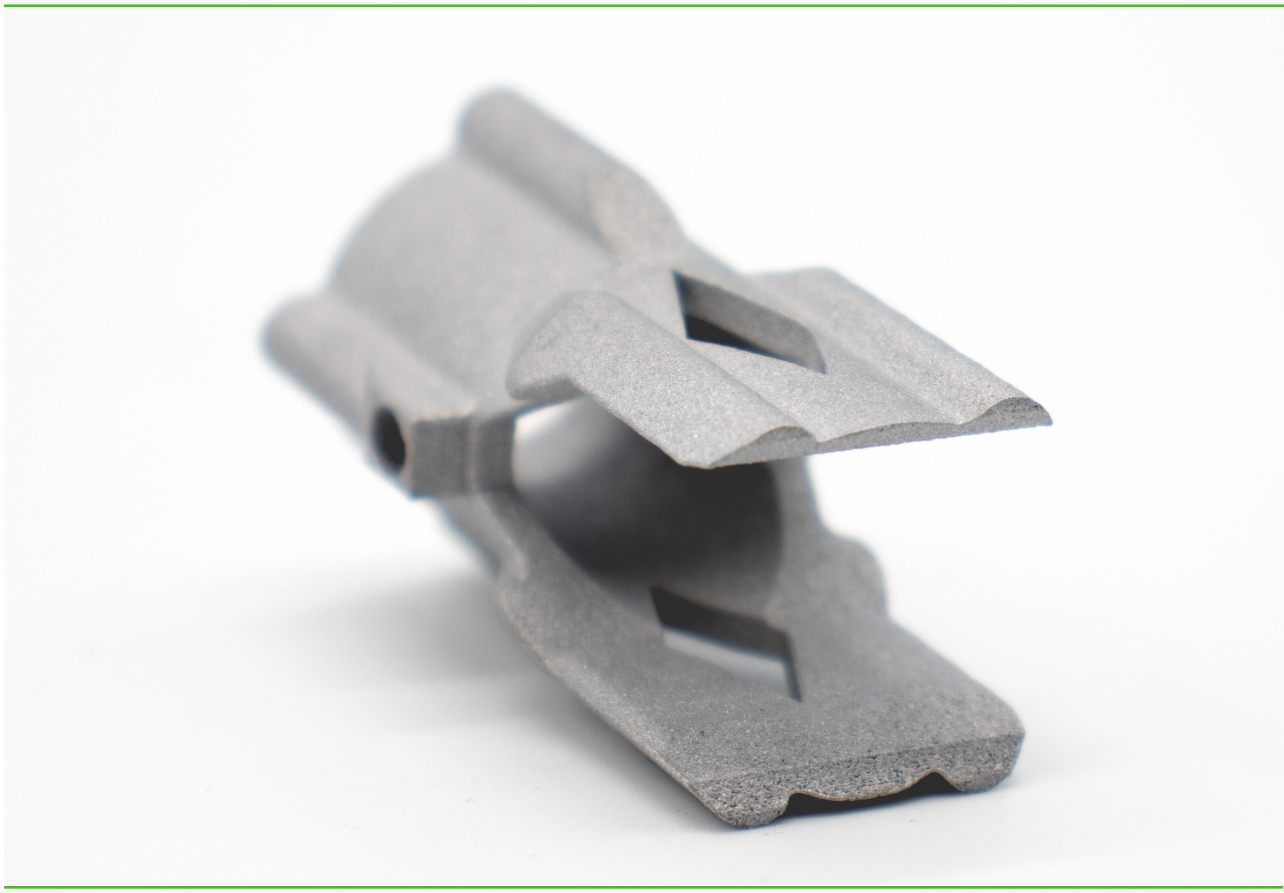
The stacked „towers“ of drivers are first sawn off directly at the building plate.
Sawing off the individual layers is not possible in this application due to the rigidity of the supports, but would be conceivable in principle.

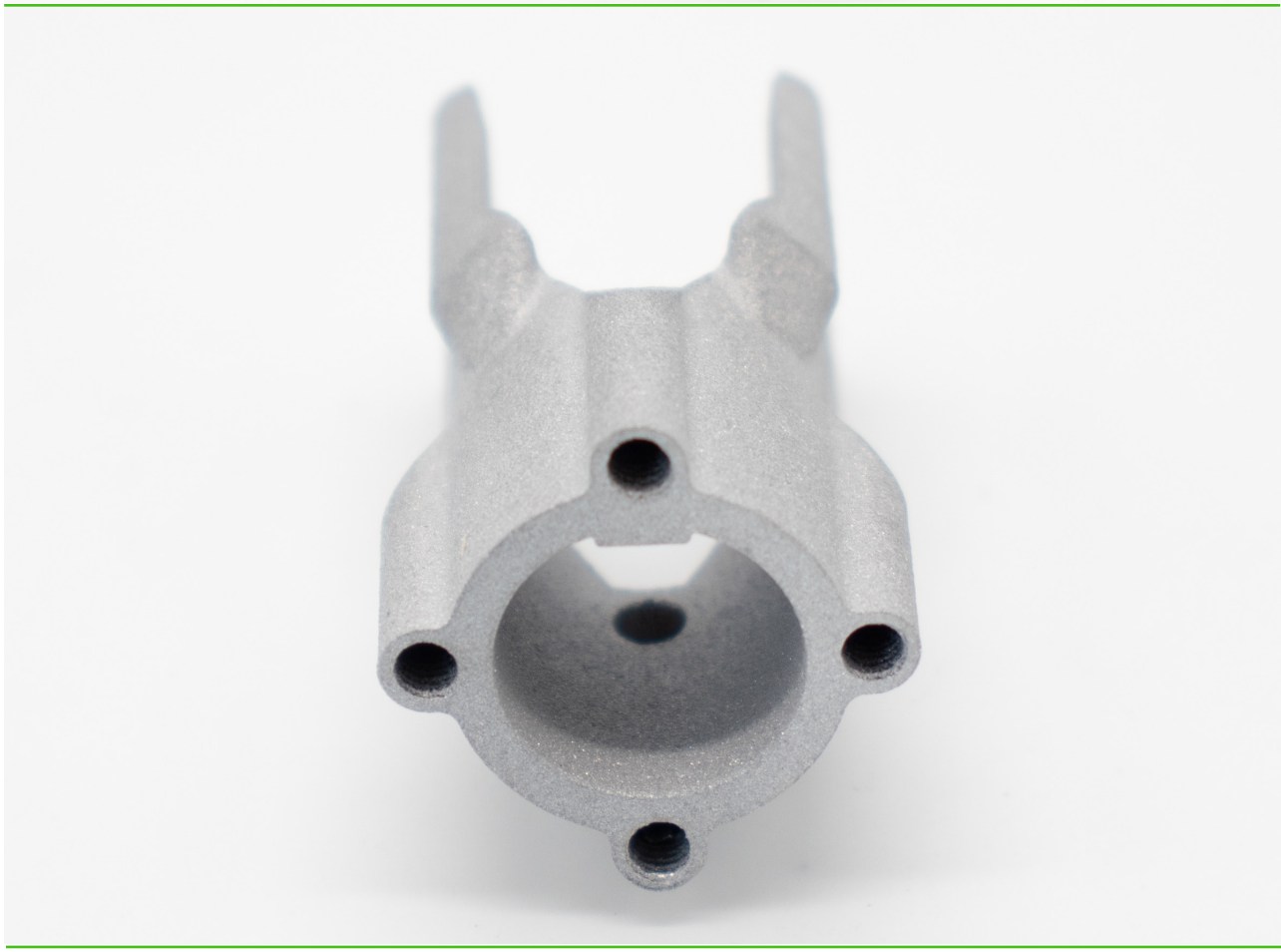
The individual drivers are separated by means of an oscillating saw. Subsequently, the support remnants are removed completely with further tools such as files and pliers.

Another advantage of the production process is that the threads can be printed directly. Only reworking of the roughness peaks using a tap is required.

The finished part is installed with a sheet metal lug and can be mounted directly on the output shaft of the motor. A screw creates a clamp with the shaft, which prevents the driver from slipping off during operation.

THE DRIVER





KEY FACTS

Technical information

Component function
Moment transmission from machine to cartridges

Material
Stainless Steel 1.4404/316L

Technology
LPBF with 200W Fiber Laser

Number of layers
3683

Build time
60,25h

Powder consumption
4,07kg

Cost of sales
11,05€/Part with 144/build job

The challenge

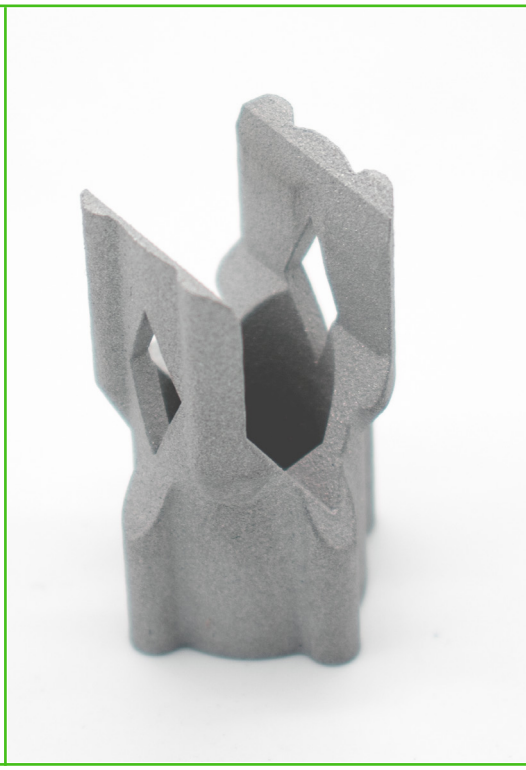
The fast and cost-effective production of a component that must fulfil complex functional and mechanical requirements and at the same time function reliably for long-term industrial use.

The solution

Additive metal manufacturing ensures both cost and material effectiveness while providing industry-standard component quality for long-term use.

The advantages

- ✓ Cost and material saving
- ✓ Accelerated development time
- ✓ Sustainable supply chain
- ✓ Individual reproduction capability



About One Click Metal

Founded in 2019, One Click Metal GmbH is a young industrial B2B based in Tamm near Stuttgart, Germany. We believe that technologies can be made understandable and accessible for everyone. That is why we simplify our product solutions so that anyone can use them successfully. With our metal 3D printing system, we primarily serve small and medium-sized enterprises and thus ensure that metal 3D printing technologies become accessible to the public. We are working on this with around 20 employees and a lot of motivation.

More information

to our website

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