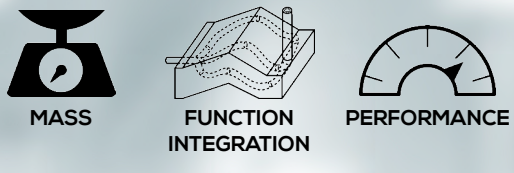
COLD PLATE

POLY-SHAPE
an AddUp company

Dimensions: 210 x 242 x 30 mm
Mass: 794 g



OBJECTIVE:

Create a cold plate with complex geometry, with a single cooling channel running under the electronic components to cool them.

RESULTS:

- Compactness and optimization of fluid circulation
- Internal channel with complex geometry

thanks to metal 3D printing.

Aluminum

CONTEXT:

In the race for electrification, among the issues is the cooling of electronic components. The challenge is twofold because the weight of the vehicle must also be as low as possible. Currently, the cold plates are made with two half aluminum alloy shells enclosing a curved copper alloy tube. The result is a heavy design with loss of heat transfer between the half shells and the tube, with a risk of loss of waterproofing.

OUR SOLUTION: METAL 3D PRINTING

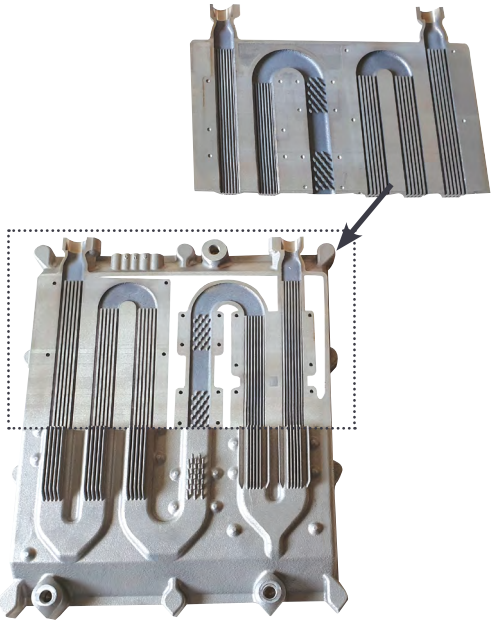
Additive manufacturing helps to limit this on-board mass because it is possible to adapt the design by dressing the functional areas thus putting material only where it is needed. The minimum thicknesses attainable are in the order of mm, lower than those obtained in foundry. It is also possible to create textures and shapes that are difficult to achieve with conventional means allowing a high thermal exchange between fluid and electronic components. **The pioneers in this field are the Formula E teams but this concept of cold plate can be applied to all industries where mass is a criterion, from urban vehicle to satellite.**

MEANS USED:

Thanks to 3D metal printing, it is possible to create various types of cooling including perpendicular and radial fins (like caloducs). During production, the structure is self-supported. The orientation of the surfaces reduces the amount of supports, which leads to a reduction in the cost and risks associated with the manual recovery of surfaces. Chemical machining can be used to improve the internal surface condition of the cooling duct and thus the performance of the part.

BENEFITS OF ADDITIVE MANUFACTURING:

This cold plate is a relevant application case for PBF (Powder bed fusion) technology. The search for compactness and the optimization of fluid circulation are successful. On this part are printed the indications to simplify the assembly and traceability of the part (serial number, version, etc.)... this saves laser engraving. **Finally, 3D metal printing allows the designer to unleash his imagination and free himself from the constraints of traditional processes. Also to focus on the functional aspect that the product must fill, usually accompanied by a minimization of the mass.**



The single cooling channel passes under all the components to cool them

THE ADDUP ADVANTAGE

The fine particle size of the metal powder used in the FormUp 350 machine enables thin walls to be printed with a high degree of accuracy and a surface finish conducive to heat exchange.