

Metal additive manufacturing at the service of watchmaking

Innovative partnership between Kif Parechoc and AddUp

Kif Parechoc, an expert in watch movement components, has signed a highly innovative partnership agreement with AddUp, a French specialist in industrial metal 3D printing, to use metal additive manufacturing for very high precision watchmaking purposes.

Located in the Vallée de Joux, one of the cradles of Swiss watchmaking, Kif Parechoc has a unique know-how in mechanical watch components. The company, a subsidiary of the Acrotec group, supplies shock absorbing systems, ratchets and barrels for famous names in the Swiss and European watchmaking industry. Always looking for innovation, Kif Parechoc unveils its partnership with AddUp (a Michelin and Fives joint-venture) a French specialist in metal additive manufacturing, which designs and manufactures machines and has its own workshops for the production of parts.

The first project resulting from this collaboration is a watch clasp. «For this project, we started with a classic product but integrated new aspects, such as lattice structures, organic shapes and recessed markings.» explains Yoann Canon, industrial director of Kif Parechoc. «We are now working on the development of new post-treatment processes, adapted to the requirements of our industry and our production volumes. At each stage of this project, AddUp was eager to collaborate. Between their mastery of the printing process and our knowledge of the products or their industrialization and our finishing operations, our companies complimented each other well.»

The watch clasp is made of low carbon 316L stainless steel. «This material, commonly used in the field of watch creation, is known for its good mechanical properties as well as its high resistance to corrosion, two essential elements in the making of a watch, comments Dr Maria Averyanova, in charge of luxury market development at AddUp. From an aesthetic point of view, 316L steel does not lose its shine or tarnish over time, and it has the added advantage of being fully recyclable.»



The Kif Parechoc workshop.
Photo credit: Kif Parechoc

A STEP AHEAD WITH L-PBF TECHNOLOGY

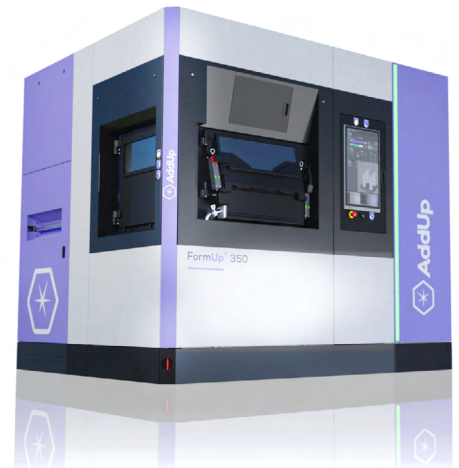
Kif Parechoc partnered with AddUp to utilize laser powder bed fusion (L-PBF) technology to manufacture the watch clasp. This technology consists of producing parts in successive horizontal layers, each layer being obtained by spreading a bed of metal powder, then solidifying the desired areas with a laser. There are many advantages: savings in raw materials, geometric complexity, and improved part performance (better heat exchange, for example). In the case of watch parts, Kif Parechoc will be able to take advantage of the possibility of printing several parts in a single operation, reducing assembly operations. «On the watch clasp, we have reduced the number of components to be assembled by a factor of two compared to equivalent products made using conventional techniques,» says Yoann Canon.

Moreover, Kif Parechoc partnered with AddUp because the French specialist in metal additive manufacturing has developed a machine capable of using fine grain size metal powders, the FormUp 350™ new generation. These fine powders make it possible to produce complex parts without supports (structures which hold the parts during printing, but which must be machined after manufacture) and also to obtain precise parts, with less rough surfaces than with most machines on the market. Combined with Kif Parechoc's know-how in surface treatments, these characteristics could give rise to parts and mechanisms that are totally new to the watchmaking world.

This is where the work currently being carried out by the two partners could be of interest in the long term. Indeed, even if metallic 3D printing has developed strongly in recent years, it is still most often used for the manufacture of «classic» mechanical parts in terms of dimensions. Industrialists in the micromechanics sector have been hesitant to adopt metal 3D printing for the reasons mentioned above related to precision and surface finish. But, thanks to the innovations proposed by AddUp and Kif Parachoc, both in the optimization of the process and in the post-processing of the parts, this partnership could pave the way to new applications of metal additive manufacturing in the watch industry and more generally in the entire microtechnology and micromechanics industry.

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The new generation FormUp 350 machine can use fine powder to print metal 3D parts. It is the solution to the challenges faced by manufacturers: safety, productivity, quality and obsolescence.
Photo credit: AddUp