

## Replacement of defective piece in a batch of medical lighting fixture



Print the Future



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**Sector:** Biomedical

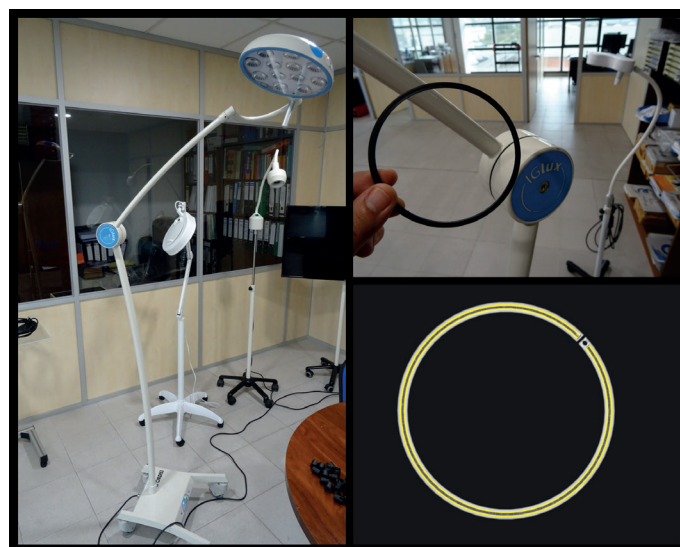
**Challenge:** Seeking a solution for a defective batch of a medical lighting fixture, specifically, replacing a joint in a joint.

**Solution:** Thanks to Markforged's technology, Onyx plus continuous fiber reinforcement, it is possible to successfully replace the defective washer without disassembling the equipment.

### CHALLENGE

Ordisi SA is a Catalan company with more than 60 years of experience in the manufacture of electro-medical equipment. They are specialized in aspiration, with a wide range of aspirators and examination lamps with halogen and led light and lamps for small and medium surgery. The challenge came to Ordisi the day a joint of a lighting equipment started to break. They had to find a way to replace that joint quickly and efficiently, avoiding the logistics of moving and repairing this equipment around the world. The added problem was that to replace the seal, the equipment had to be disassembled, something that can only be done at Ordisi's facility.

Markforged's technology met the necessary conditions to create the new washers and be able to send them to each of the customers. The design of the washer allowed the user to be able to replace the washer easily and independently.



*To insert a closed washer, it is necessary to disassemble the lamp, with the open design with reinforcements it can be replaced without disassembly.*

### SOLUTION

The logistics of bringing the equipment back to Ordisi's facilities was a major expense, considering that the equipment was spread all over the world. Instead of remanufacturing the joint and proceeding with the repairs, they focused their efforts on designing a new version that would solve, first of all, the handicap of the transportation logistics. Knowing the different possibilities, after analysis and costing, they used a Markforged Mark Two 3D printer purchased through 3DZ. Ordisi manufactured an open spare part made of Onyx, with continuous Kevlar fiber reinforcements along the entire contour, which would allow the end customer to assemble it autonomously and without disassembling anything at all. Production was completed in a matter of days, in much less time than if the team had selected a traditional manufacturing method. They also discovered that it allowed them to manufacture a large number of components according to their demand, which they had previously done by machining, operating the printer 24/7 to achieve more than 6,700 hours per year of printing. Two and a half years later, after more than 15,000 hours of printing they have started to expand their printing capabilities with an X3 machine from Markforged's industrial 3D printing range. Both machines are currently

printing one or more print trays during the day and one tray to print all night, just before the end of the day, optimizing their performance to the maximum.



*The mechanical behavior and finishes of the printed parts allow them to be used as end-use parts.*

### ADVANTAGES

- Production was completed in a matter of days.
- Design flexibility made it possible to manufacture this easy-to-install spare part.
- Direct manufacturing, without the need for tooling.
- Rapid iteration, so that different versions could be tested to find an effective way to replace the defective seal quickly. Hours instead of weeks and at a lower cost.
- No need to outsource, with the added cost and time that this entails. This also prevents a greater number of tests from being carried out.
- The costs for shipping a package for a few grams of replacement are much lower than the round-trip costs of the bulky package needed to ship complete lamps.
- Quality parts in Onyx, polyamide with carbon fiber. The quality and finish of the parts allow them to be used in multiple applications, starting to manufacture with this same 3D printer a large number of components for their lamps.
- Production planning by batches.
- It is a robust, precise and reliable equipment, which allows the production of high-quality parts. Continuous and unattended work.
- The only post-processing is the removal of supports if necessary. The supports can be removed by hand.
- At present, a large part of its production uses printed parts that were previously produced by machining. The printing of more than 1,500 hours in 2 and a half years has been achieved.
- More and more applications are being found for Markforged parts. At present, a large part of their production uses 3D printed parts.



*In addition to solving the problem with the washers, they are now producing batches of parts according to their needs.*