

# Inflatable Wheelchair Cushion

Redesign and 3D printing of the pneumatic system of the Nubolo cushion to improve comfort

## About OKM

OKM, founded in 2000, is a leading orthopedic company specializing in innovative products for custom orthotics, prosthetics and mobility systems.

With more than 20 years of experience, they actively support orthopedic technicians in creating comfortable and attractive solutions to improve personal autonomy.



## Challenge

Isidre Esteve, a motorcycling driver, suffered a serious accident that left him in a wheelchair due to spinal injuries. Even so, his strong passion for the world of racing led him to take part in the Dakar Rally, a very demanding and challenging discipline in terms of conditions.

However, this experience, along with his daily life in a wheelchair, led to the development of skin ulcers due to constant pressure. In response to this issue, Isidre decided to collaborate with OKM to seek an innovative solution, not just for himself, but for all those who suffer from it.





## Solution

After an evaluation, it was decided to completely transform Nubolo using AM, creating a new concept.

Design for Additive Manufacturing (DfAM) was employed to design and optimize the internal components, reducing the required manual labor and resulting in shorter product assembly times and lower operational costs. Adapting each part was to 3D printing technology.



### 3D Printer



HP MJF 5200

### Material



HP - PA 12

### Post-Processings



Abrast - Sandblasting

### Software



Materialise - Magics



Vapor Smoothing

## Impact for customer

The switch to additive manufacturing has brought substantial benefits to Nubolo's customers. Despite the higher initial cost of parts, it has significantly reduced manual assembly, cutting operating costs by almost 75%. This translates into a more affordable and efficient solution.

Customers have experienced remarkable comfort, as the cushions are now custom-designed to fit their bodies and surfaces perfectly. This promotes healthier seating postures and an even distribution of pressure, which improves overall well-being.



The scalability of AM has made Nubolo's tailored cushions accessible to a broader audience, ensuring more people in need can benefit.

Furthermore, AM has streamlined production, resulting in quicker deliveries and reduced operating costs.

Lastly, this shift towards AM aligns Nubolo with sustainable practices by reducing material waste and energy consumption, enhancing customer satisfaction.