



CASE STUDY

OECHSLER's Trekking Backpack – to fill your soul with Wanderlust

 **OECHSLER**

PROJECT BREAKDOWN

Application

Trekking backpack

Why OECHSLER

We are a partner of innovation and additive manufactured solutions – from idea generation to global production

Material used

Ultrasint® TPU01

The result

New carrying experience by 3D-printed lattice comfort elements.

All seasons, all trails – trekking backpacks are designed to support heavy loads in comfort and style. The back pads of your trekking pack are the paramount comfort element – without them, any tour quickly becomes torture. Therefore, OECHSLER developed a novel solution for outdoor enthusiasts.

OECHSLER – one of the worldwide pioneers in Additive Manufacturing – has been inspiring renown customers from various markets with its additive solutions since 2017. Now, OECHSLER developed a new-generation trekking backpack by using industrial-scale 3D-printing technology and high-performance Ultrasint® TPU01 by BASF. The main objective was to enhance the hiker’s carrying experience by substituting conventional foam-based back pads with 3D-printed lattice comfort elements. The result is a trekking backpack that delivers the comfort outdoor lovers demand. Moreover, OECHSLER also satisfies the hiker’s desire for a sustainable lifestyle by using 100 % recyclable material.

THE STORY BEHIND

Dr. Leonhard Klein, one of the AM Program Managers at OECHSLER, used his summer vacation for hiking. After several hours of wandering, his shirt was uncomfortably damp in the carrying area of the backpack. As usual, he changed his shirt and went on.

Even with very high-quality equipment, the unpleasant wearing comfort remained in the area where backpack and body met. Other hikers also seemed to have the same problem, as it turned out during the hut rest. Back in the office, he took a closer look at this supposedly unavoidable problem.

What would a perfect carrying strap have to look like in order to minimize the feeling of warmth and friction in the carrying area? Afterwards, the hands on OECHSLER Additive Manufacturing Team got down to redesign the conventional back padding. Various analyzes about pressure points were absolved to built the perfect geometries and start file programming as well as the first printing tests.

A few weeks later, they were able to subject the first printed back padding including the abdominal belt to a wearing test: and felt a tremendous improvement.



GREAT COMFORT BY UNPRECEDENTED FUNCTIONALITY

Thanks to freely designable lattice structures only possible by using Additive Manufacturing, a fully integrated cushioning experience unlocks superior comfort. The open cell structure of the 3D-printed back pads and hip fins strongly enhances air ventilation, minimizes heat accumulation and thus noticeably reduces the temperature (3 to 5 °C) as well as relative humidity rise at the contact area to the hiker's back. Furthermore, maximum and mean contact pressures are significantly reduced.

The damping characteristics of the lattice structure are adjustable via the lattice geometry, the strut thickness and the size of the lattice. This allows variant areas of the lattice to have different degrees of hardness, thus increasing damping properties and comfort.

The four different examples below show OECHSLER's versatile material and design options which open up unlimited flexibility regarding function, comfort and visuals.



Driven by the idea of offering our customers more flexibility and efficiency in production, OECHSLER can realize small lot sizes as well as high-volume series production and complex components. The special

Ultrasint® TPU01 material is a multi-purpose TPU that offers strong, flexible and very durable part performance, combined with excellent surface quality.

Furthermore, the material is very easy to print with high process stability and one of the highest throughputs for flexible material in the 3D printing market. As an additional material option, Carbon's EPU 41 is a production-scale elastomeric material that is especially well-suited for elastomeric lattices where high resiliency is needed. The duration of one print depends on the lattice structures and thus is very variable.

SUSTAINABILITY

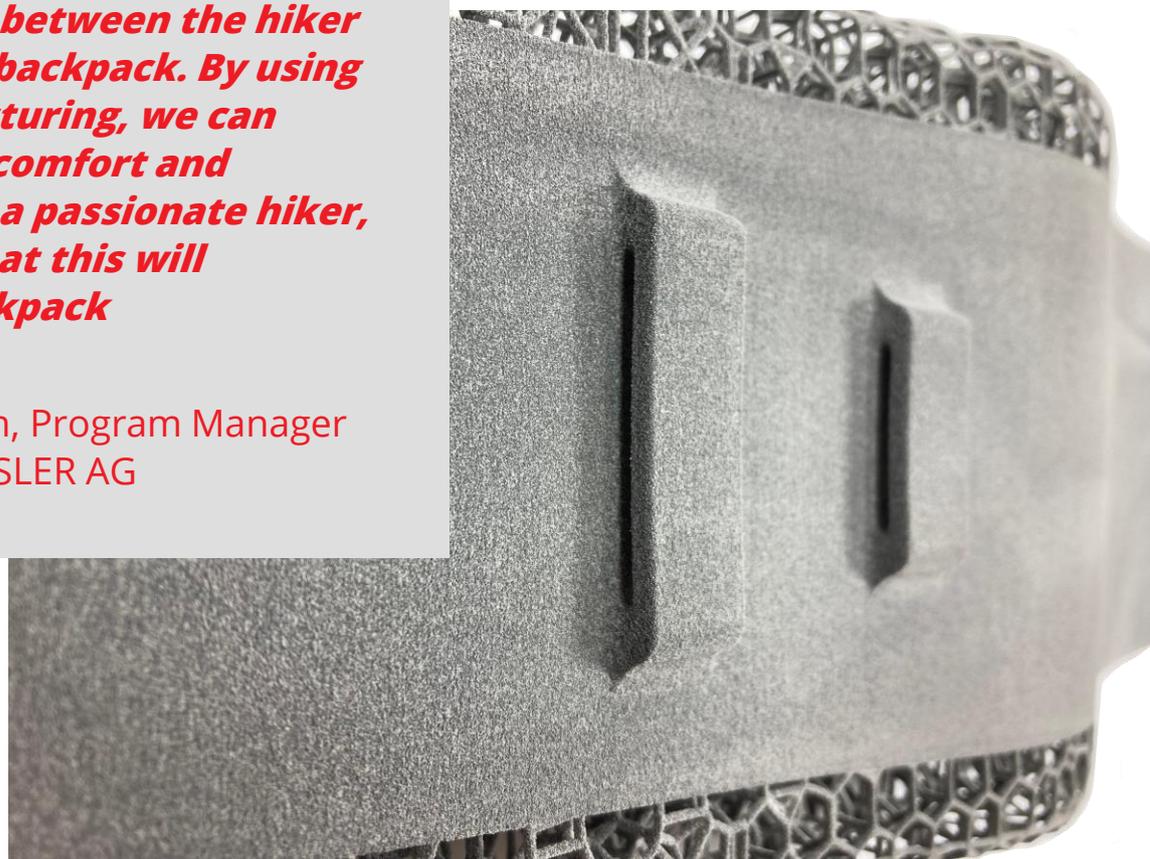
Thanks to the design flexibility enabled by Additive Manufacturing, the back pads and hip fins can be produced in a single piece – reducing assembly steps, assembly time and ultimately costs significantly – no gluing or sewing is needed anymore.

Moreover, unprocessed Ultrasint®

TPU01 powder gets fully reused in subsequent print jobs. Also printed parts can be recycled 100 % at the end of their lifecycle. This makes the printed trekking backpack elements by OECHSLER a fully sustainable solution.

“Back pads and hip fins represent the key interface between the hiker and the trekking backpack. By using Additive Manufacturing, we can achieve superior comfort and functionality – as a passionate hiker, I am convinced that this will revolutionize backpack manufacturing.”

– Dr. Leonhard Klein, Program Manager
AM Lattice at OECHSLER AG



OUTCOME

OECHSLER offers customized solutions for printing trekking backpack elements including a full range of services from development to global production. The trekking backpack creates a completely new carrying experience by its integrated 3D-printed lattice comfort pads.

Here are some of the key benefits for the customer:

- Maximized air ventilation
- Significantly reduced temperature (3 to 5 °C) and relative humidity rise at the contact area to the hiker's back
- Reduced maximum and mean contact pressures
- Adjustable damping characteristics by different degrees of hardness in one part
- Unlimited design flexibility
- Easy & fast assembly
- 100 % recycling of printed material

HAVE WE SPARKED YOUR INTEREST?

Let's talk about your ideas – we're ready to support your project.

[**▶ GET IN TOUCH!**](#)