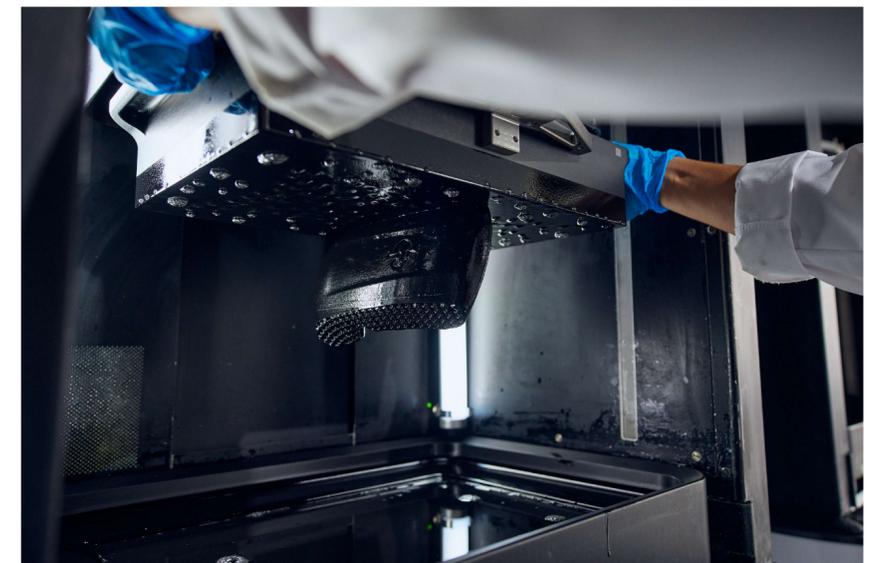


ADDITIVE MANUFACTURING FOR WORKWEAR OF THE FUTURE



01

INTRODUCTION

Application:

Workwear

Why STRAUSS & OECHSLER:

STRAUSS is the leading brand for workwear in Europe, and is constantly driving solutions to improve working life for their customers. As a powerhouse of Additive Manufacturing, OECHSLER is the ideal partner to implement these products in series production.

Material used:

Carbon EPU 41

The result:

3D-printed elements of protective gear



COLLABORATION

What does the workwear of the future look like and how can we move forward?

STRAUSS, an industry leader in workwear, has closely followed forward-driven technological advancements in order to answer these questions. For their recently launched Master Grid 6D collection, STRAUSS implemented Additive Manufacturing for ergonomic kneepads that have been ideated and developed in close collaboration with OECHSLER.

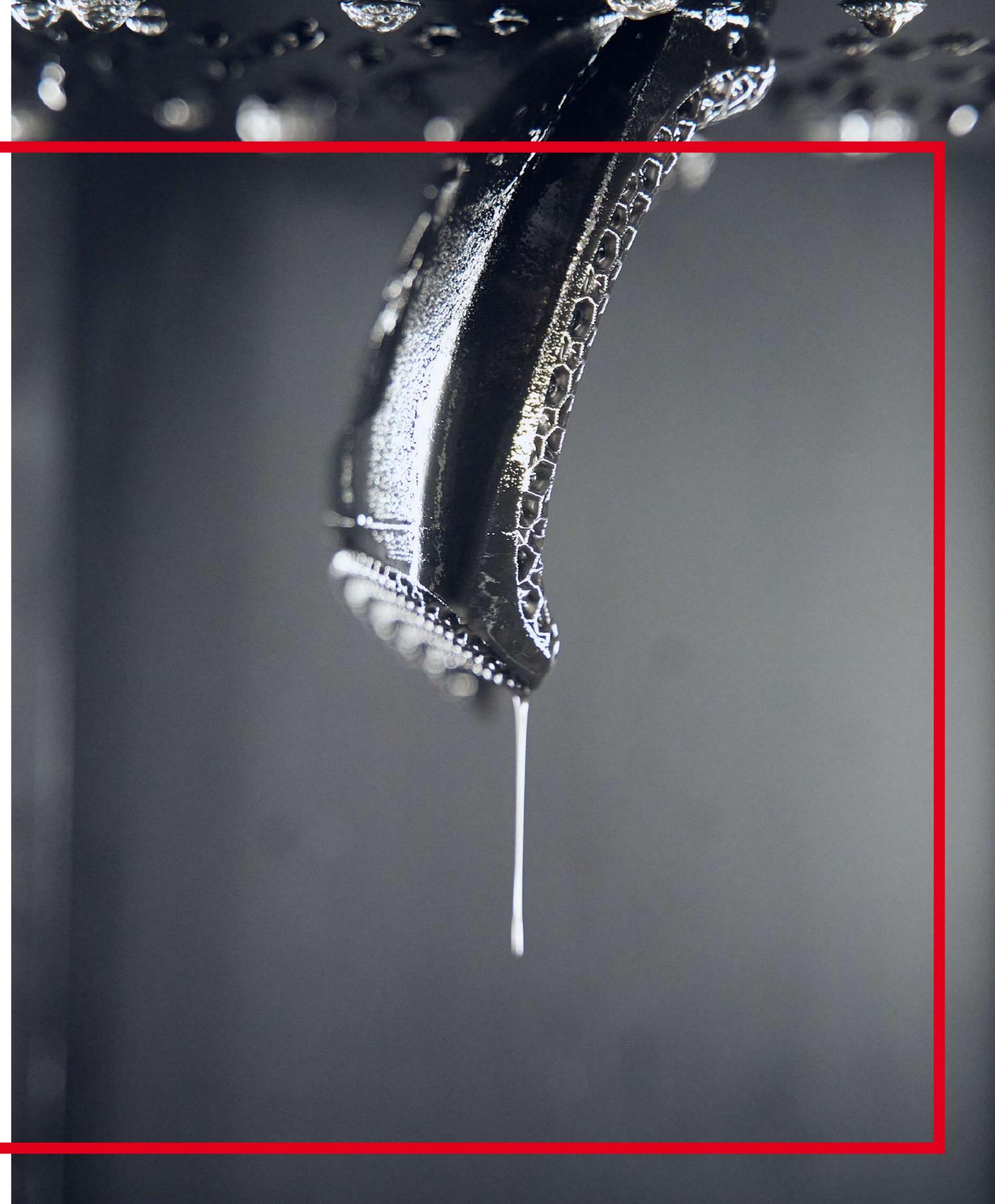
THE SOLUTION

Additive Manufacturing can enhance damping properties or energy recovery, depending on the geometry and the alignment of the lattice cells in a product's shape.

OECHSLER's engineers assessed several lattice designs to verify that a striking hexagon shape which perfectly meets everyday workwear requirements for absorbing loads and

pressure. The Master Grid 6D design is applied across all 3D-printed products by STRAUSS.

For their first collection, STRAUSS uses open additively manufactured lattice structures as comfort and functional elements for their knee pads.



MATERIAL CHOICE

To determine the ideal material that can endure all the challenges of the working day, extensive testing occurred at OECHSLER's AM testing center.

Abrasion, washability, and bending load tests, according to DIN ISO 14404, validated that Carbon EPU 41, an elastomeric material, is the best fit in terms of durability and displays significantly less volume loss than conventional materials.

Thus, STRAUSS's Master Grid 6D product line provides increased longevity. For example, after 50,000 bending load cycles, no crack propagation was identifiable.

Additional demands to achieve workwear standards included biocompatibility, temperature resistance from -10 to +70 degrees Celsius, breathability, and waterproofing.



TAILORED MANUFACTURING PROCESS

OECHSLER operates a technology-independent industrialized high-volume series production of 150 printers capable of producing more than 2 million parts per year, having realized several prestigious projects in the Sporting Goods and Protective Gear market, including shoe soles and football helmet inlays.

STRAUSS's knee pads are produced in series production at OECHSLER's Additive Manufacturing Hub in Germany, providing a local-for-local approach and tailored pre- and post-processing solutions while utilizing the Carbon platform.



STRAUSS'S WORKWEAR PRODUCTS AT A GLANCE

KNEE PADS

Design to Additive Manufacturing

The geometry of the e.s. Knee Pad Master Grid 6D has been predetermined based on the existing knee pad shape to ensure compatibility across all certified STRAUSS trousers. The development process included the conversion of the solid shape into a lattice structure.

Following a "Design to Additive Manufacturing" approach, we leveraged the design freedom of 3D printing to integrate additional functionality. The design has been optimized for printing and pre- and post-processes to enable series production at scale.

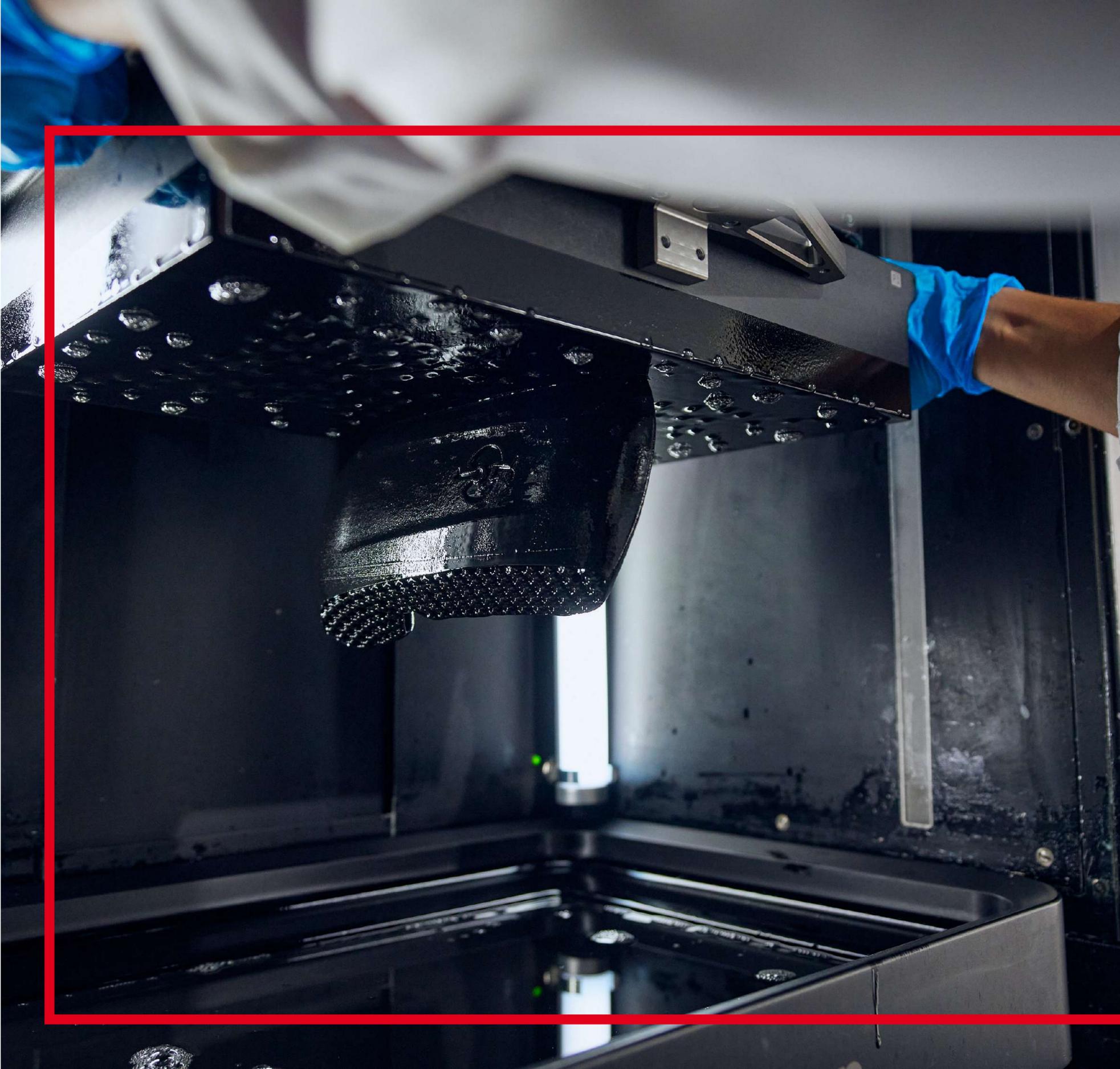
Knee Protection of the Master Class

Putting health and ergonomics first, our engineers used body mapping to determine pressure points in knee pads during an craftsman's everyday life.

STRAUSS and OECHSLER have set new standards in comfort and durability by achieving a high protective effect and optimum pressure distribution of 70% energy absorption and 30% restoring force when kneeling. A continuous lattice structure outside the knee pad has been implemented to protect against sharp objects and ensure safe working in extreme environments.

Because STRAUSS products are made for work, professional craftsmen have tested them to the limit regarding comfort, stability, and suitability.

The tests found that the redesigned knee pads provide excellent absorption and wearing characteristics - dynamic material for most complex movements, certified to DIN EN 14404, easily exchangeable, and compatible with STRAUSS work trousers.



“With our technology partner Oechsler we are able to step into a totally new world of workwear. A world of products that is asking for maximum safety requirements and individuality. The 3D printing technology enables us to design the highest level of comfort, stability and protection in a sustainable and long-lasting way. It helps us to translate valuable customer feedback rapidly into our development process and fulfill their demands on high-end workwear products.”

Strauss Design Team

05

OUTCOME

STRAUSS has successfully launched high-quality solutions for workwear, taking advantage of OECHSLER's expertise in developing and manufacturing additively manufactured applications. Designed for work environments and leveraging the benefits of 3D printing, we put ergonomics and the wearer's comfort first – unprecedented product quality and material strength ensuring longer product life cycles.

All product benefits at a glance:

- Freely designable lattice structures for enhanced functionality and comfort in STRAUSS's knee pads
- Optimal pressure distribution and damping characteristics for all types of work days
- Dynamic and durable EPU 41 material to increase longevity
- Meeting all workwear requirements, e.g. ISO 14404, ISO 20347





**ARE YOU INTERESTED IN OUR AM-PRODUCTION?
DO NOT HESITATE TO CONTACT US AT
3DPRINTING@OECHSLER.COM**