



High-Performance Protective Gear

Achieving new levels of safety through 3D printing with synergy of material, technology and design



OVERVIEW

After spending three years on research and development, Xenith launched its first helmet in 2009. It was not only designed to meet and exceed safety regulations, but also to transcend protection by pushing the boundaries of fit, feel, comfort, durability, performance and style. In collaboration with BASF Forward AM, Xenith developed and tested intelligent impact absorbing lattice structures to engineer a high-performance helmet that would provide exceptional protection for both NFL athletes and players of every level with cushioning pads that are customized to the athlete for a perfect fit, ensuring player safety.

QUICK FACTS

Design Software:

- Ultrasim®

Technology:

- Multi Jet Fusion

Material:

- Ultrasint® TPU01

Finishing:

- Ultracur3D® Coat F



Xenith was founded in 2006 by Vin Ferrara, a former Harvard quarterback and Columbia University MD. Located in Detroit, Michigan, the 66,000-square-foot headquarters and production facility houses an impact testing lab, custom paint booth, reconditioning operation, showroom and warehouse. The Xenith philosophy is that if a helmet does not excel under the most stringent testing available, it should not be on the field.

XENITH.COM



63% Rebound
resilience



Reusability rate
of up to 80%



Key component
of award-
winning NFL
project

Challenge: Develop and virtually test intelligent impact absorbing printed structures

In collaboration with Forward AM, Xenith utilized [Ultrasim®](#), a unique Virtual Engineering design service for 3D printed components to create a high-performance helmet that would provide exceptional protection. This innovative software was used to accurately model shock absorption enabling the design adaptation of printed structures through precise simulation to achieve a specific force deflection response. Through Ultrasim®, unique energy control cells were designed to cushion low-speed impacts and intelligently strengthen for high-speed impacts.

“Team Xenith’s prototype was built based upon a strong basis of research, collaboration and innovation. Members of our team have been involved in the foundational research to understand on-field impact performance and comfort.”

-- Ron Jadischke (Chief Engineer, Xenith)



Challenge: Identify optimum combination of materials, technology and processes

Forward AM’s advanced engineering and design expertise helped Xenith to identify the optimum combination of materials, technology and processes that were both cost-effective and time efficient. Our [Ultrasint® TPU01](#) is ideally suited to manufacturing complex lattice structures with class-leading shock absorption due to its high processing stability and accuracy. The extremely detailed and intricate designs of the helmet’s interior structure is made possible because of the outstanding mechanical properties of Ultrasint® TPU01 powders.

Ultracur3D® Coat F - Flexible Coating enable an aesthetically enamel-like surface that not only ensures helmets will look great but will also provide functionalities such as moisture impermeability and resistance to dirt and oil.

[Learn more about Ultrasint® TPU01:](#)