IMPACT PROTECTION

DESIGN AND MATERIAL SOLUTIONS

AVIENT™

PROJECT KICK OFF

BRIEF

Application: Protective sports equipment

Challenge: Provide functional material to protect against impact for chest protector

Requirements:

- Compact - reduce thickness and weight for improved comfort and functionality
- Meet EN standards
  - EN1621-1 level 2 & EN1621-2 level 1
- Eliminate the use of foam and glue
- Be waterproof and easy to clean
- Sustainable
- Easy to prototype & considers manufacturing efficiency

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VIBRATION DAMPING TECHNOLOGY (VDT)

HOW DOES IT WORK?

VDT reduces bounce

Simplified Drop Test

- 65g steel ball
- Dropped from 305mm
- Onto 3.175mm thickness flat samples

Materials Tested

- Standard TPE 30 Shore A
- TPU alloy 60 Shore A
- Damping TPE 32 Shore A

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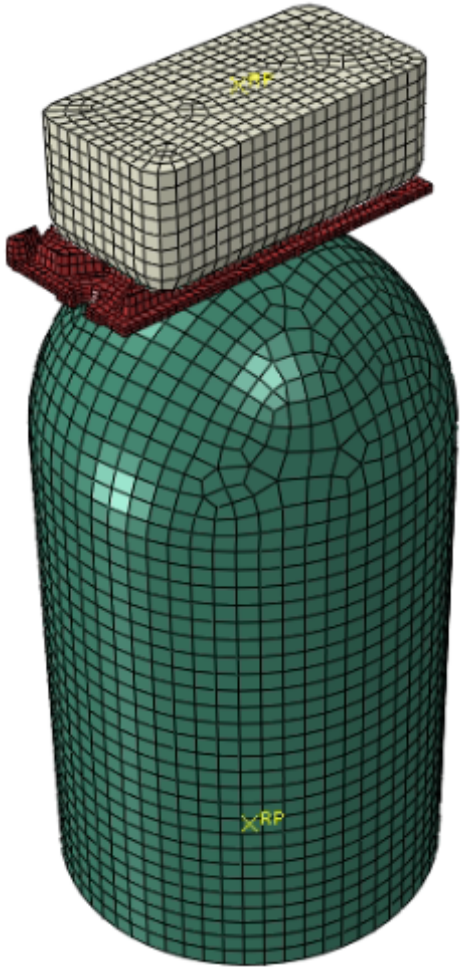
SIMULATION & CALIBRATION

EN1621-1 LEVEL 2

Simulation of Impact

A weight dropped onto protective element in contact with rigid substrate

Image courtesy of Airobag TV
https://www.youtube.com/c/AirobagTV/videos



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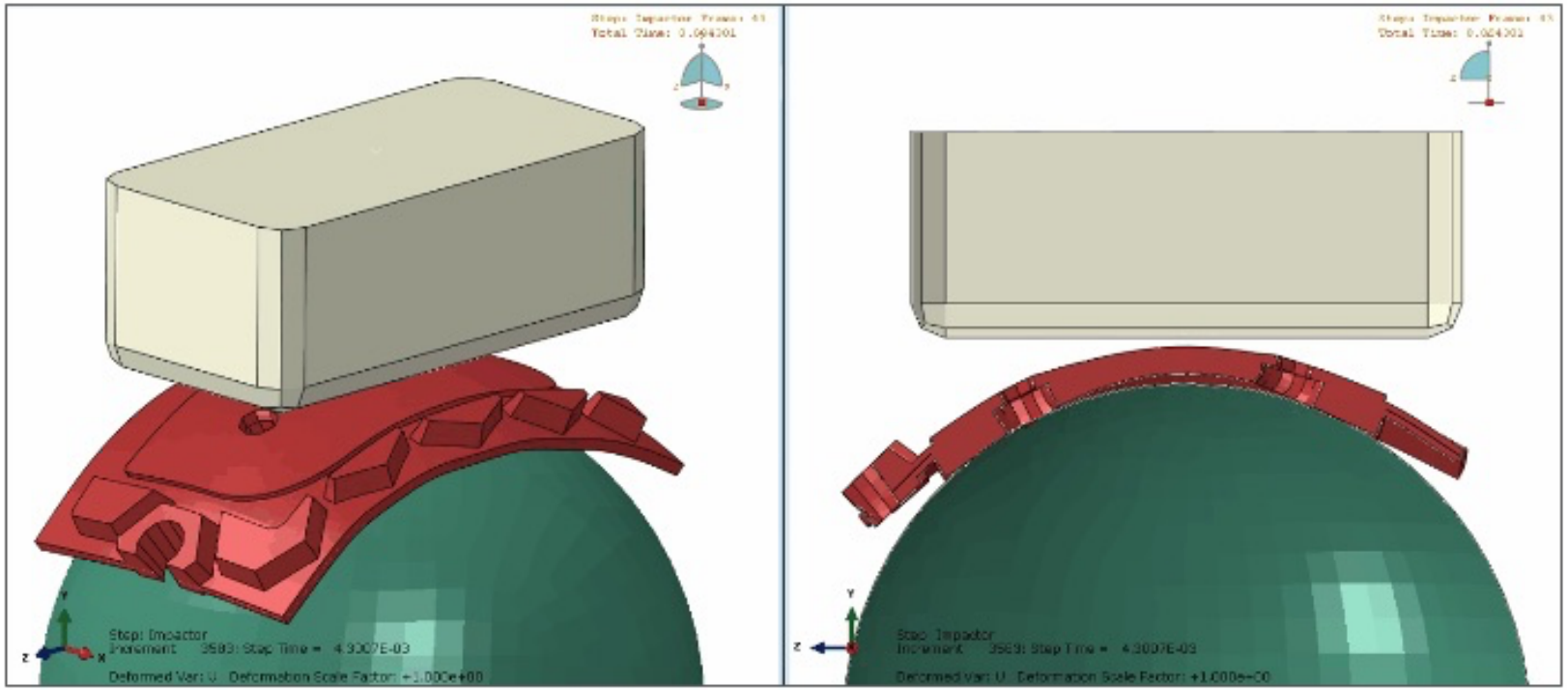
SIMULATION & CALIBRATION

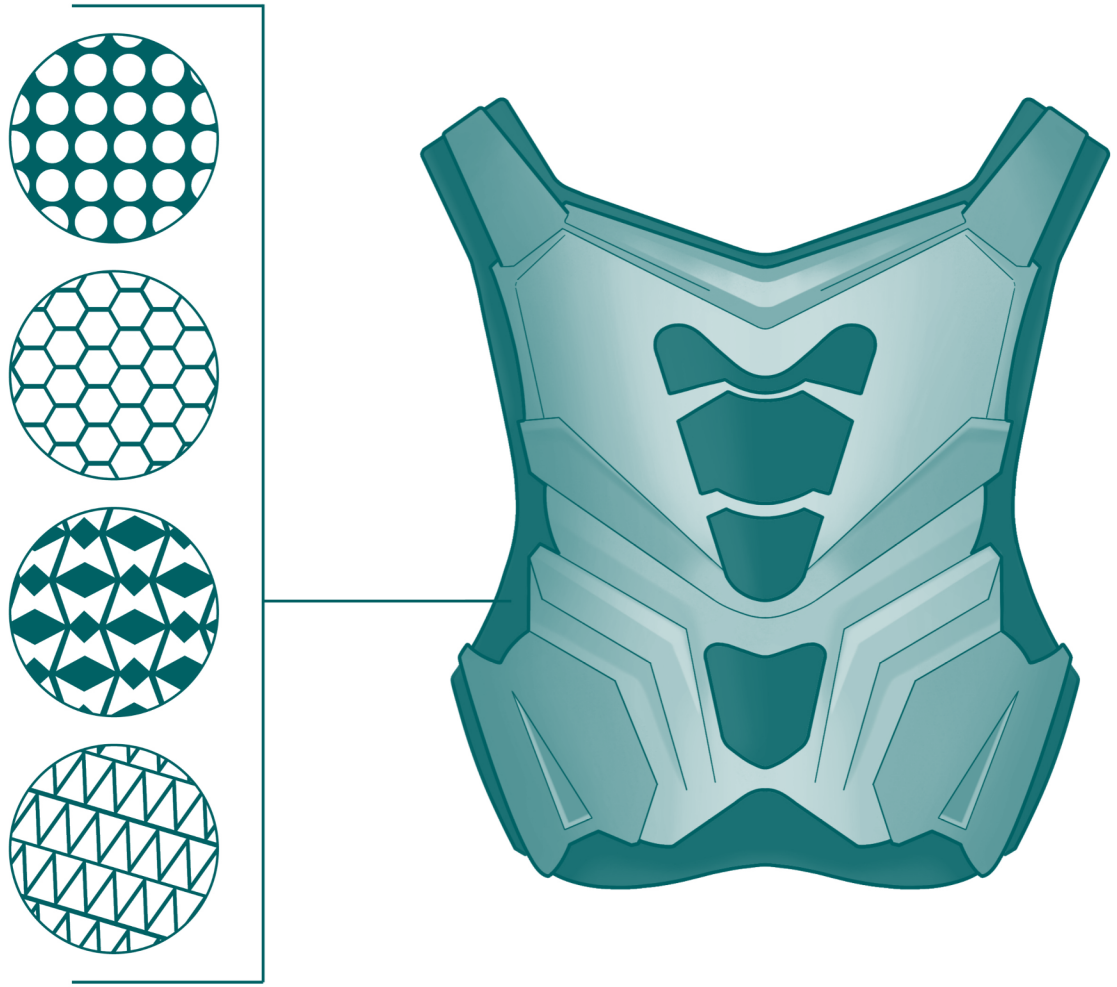
EN1621-1 LEVEL 2



REFINING THE DESIGN

DESIGN AND MATERIAL COMBINATION

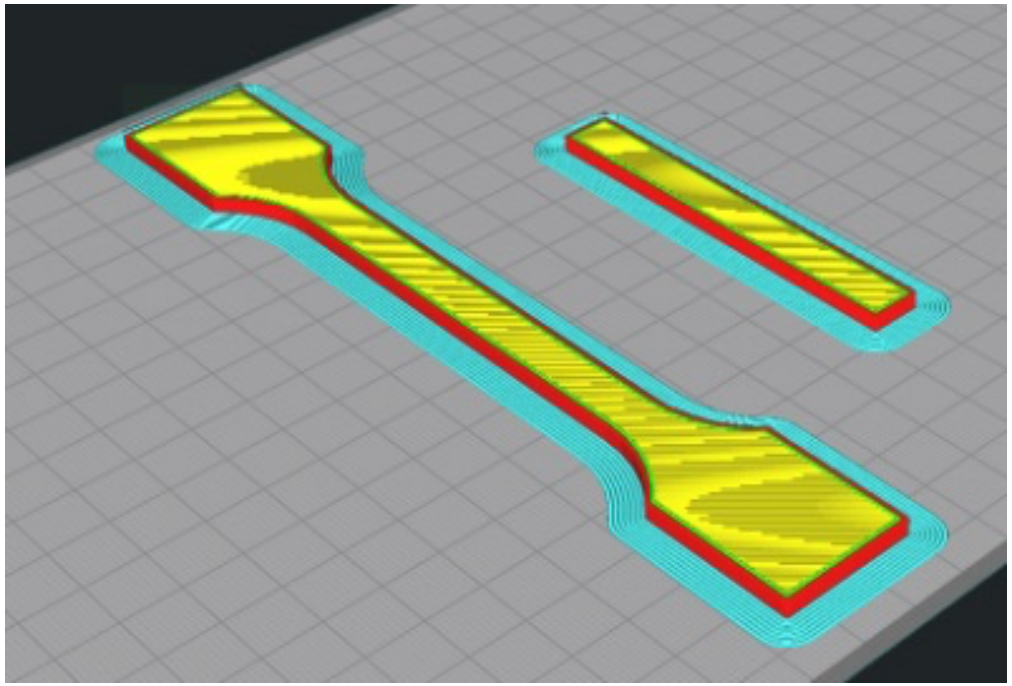
- A number of different shapes and designs are created and simulated to determine which one works best
- Refining to meet EN standard
- VDT TPEs can help reach compliance with EN1621-1 level 2 and EN1621-2 level 1
- Optimum protection can be achieved by combining industrial design and engineering



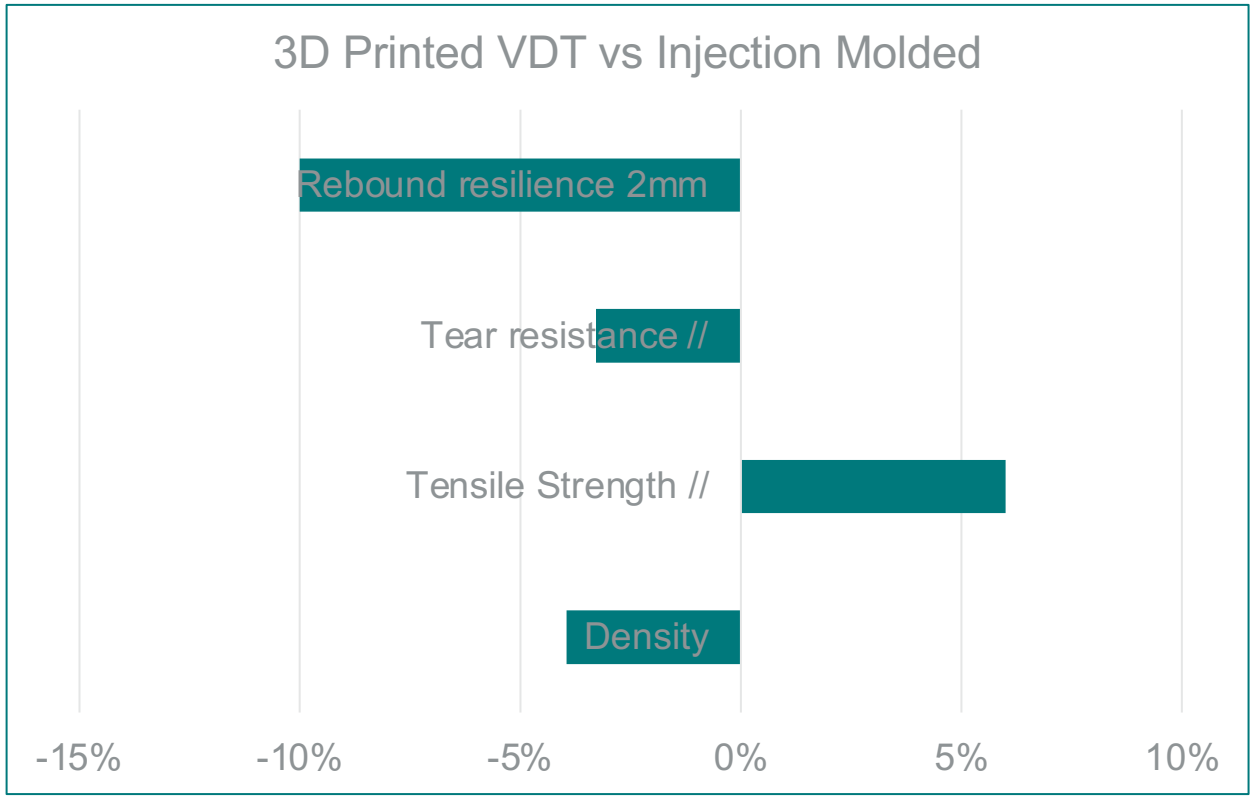
VALIDATION

PROTOTYPING WITH 3D PRINTING

VDT can be 3D printed for concept evaluation early in the design process



3D Printing Validation



SUMMARY

- Enabled a new, compact design with a customized VDT TPE formulation
- Improved user comfort and functionality
- Fulfilled EN standards
- Reduced number of prototyping tools required
- Reduced time spent in product development by 40 percent, enabling faster commercialization of product

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