

## REINVENTING CIRCULAR AND FUNCTIONAL MATTRESS FOR THE HEALTHCARE SECTOR

Mattresses for the healthcare sector are designed for robust use with a core foam layer and a polyurethane-coated polyester textile cover. Nurses and surgeon indicate that, these mattresses are highly uncomfortable to patients because of poor microclimatic management (air, moisture, temperature, friction, pressure regulation, etc) across the mattress, which can cause pressure ulcers (in less than a day). The problem is severe (e.g., extra recovery time, medication, increased risk and costs) for patients with wounds, infection, pressure-sensitive decubitus. The Netherlands has nearly 180,000 mattresses from the healthcare sector of which nearly 40,000 mattresses are discarded. Figure gives an overview of the research scope and positioning of participating companies related to this project.



**AIM:** Within the scope of this project, we will design, develop, and test a circular & functional mattress for the healthcare (cure & care) sector.

### TASK DESCRIPTION

The focus of the assignment can be on one or more aspects of the following,

- **Design aspects:** Deal with virtual design for to be circular mattress components such as mattress core and mattress cover validated by the stakeholders (Figure).
- **Prototype Mattress cover:** Proof-of-concept functional mattress cover with microclimate management. To investigate eco-designing aspects of mattress cover having desired functionality for healthcare and consumer market. Several areas to be explored such as a) monomaterial concepts, b) integration of multilayer membranes concept for selective porosity e.g. Gore-tex® c) possibilities for single sided breathable (bio)-chemical functionality building etc. Eventually to develop a toolbox of triggerable materials/technologies for recycling (debonding) suitable for use on mattress cover.
- **Prototype Mattress core:** Proof-of-concept mattress core with 3D spacer technology with efficient pressure distribution and circularity.

### PRACTICAL INFORMATION

- **Student profile:** Above assignment can be further customised to fit the interest and expertise of an individual or group of students from F&TT (textile), ITD (master), Chemistry, Nanotechnology, Nursing, Mechanical Engineering, Biology. Students doing internship, bachelor, master thesis are encouraged to apply.
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