RE³Tex – enhancing circular economies in the textile and clothing industry using the example of a model implementation

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Abstract: RE³Tex is a project funded by the German Federal Environmental Foundation (DBU) and realized by the Center Textile Logistics (CTL) in Mönchengladbach, Germany. RE³ stands for repair, reuse and recycle and aims at transforming business models in the (outdoor) fashion industry to promote a sustainable approach to the use of resources in the textile and clothing industry.
The project started in March 2022 and will be finished by the end of September 2024. Multiple regulations on European level, e.g. the EU strategy for sustainable and circular textiles or the EU sustainable products initiative, force clothing manufacturers to implement sustainable strategies into their businesses. Clothes shall prospectively be durable, repairable and recyclable and according to the waste hierarchy [1] prevention, re-use, recycling and recovery of resources are shall be preferred to the disposal of products. Until now, almost no profitable business models exist in the industry that prove economic efficiency of the implementation of repair services and reverse logistics for recycling. Within the scope of RE³Tex clothing manufacturers, retailers and further important stakeholders of the textile value chain learn about the parameters that influence the potential for a circular textile value chain in garment production, for example by a devloped mutlimedia manual. A specific feature of RE³Tex is the transfer of theoretical concepts into practice together with partners from the industry. The learnings from the practical simualtion are shared. Current challenges for manufacturers and retailers exist e.g. in the collection of the required minimum quantities of used textiles of their own brands which are necessary for a good recycling machine capacity utilization. The development of own take-back systems for used textiles offers the advantage of material knowledge, however the business model must be profitable and accepted by customers. Outdoor fashion is very hard to be (fibre-to-fibre-) recycled as laminates and the used material compositions cannot be teared well by mechanical recycling.
The necessary quantities for profitable mechanical recycling strategies may only be achieved by a cooperative approach of manufacturers and retailers in the future. The various participants along the textile chain must cooperate, e.g. in form of sharing information about the material composition of their manufactured clothes to close the loop efficiently. Additional costs for repair services my prospectively be covered by adopted retail prices and re-commerce concepts may help to remain profitable on the market.

Keywords: *circularity, recycling, repair, sustainability, outdoor fashion*

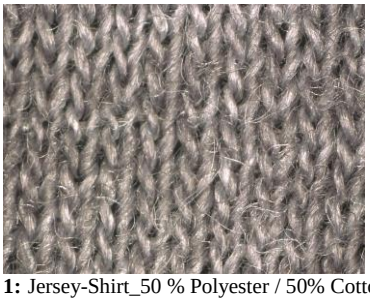

Figure 1: Jersey-Shirt_50 % Polyester / 50% Cotton_x50

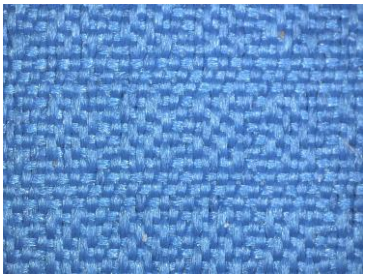

Figure 2: Outdoor jacket_Main fabric: 100 % Polyester / Lining: 100 % Polyamid / Membrane_x50

Figure 1+2: Analysis on the *Keyence light microscope_VHX-600_VH-Z20R* ith regard to recycling potential. Top: CO/PES jersey, indicating the best recycling quality due to surface structure and material composition. Bottom: Laminated multi-layer outdoor jacket, indicating a low recycling potential due to material variety, narrow woven structure and membrane.

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REFERENCES

[1]. European Commission: *Waste Framework Directive.* Envorionment. 2023. https://environment.ec.europa.eu/topics/waste-and-recycling/waste-framework-directive_en. Accessed on 29th February. 2022