

Project Titel: Development of a new type of polishing wheel on the basis of native textile fibres to enable a light gloss polish. Substitution of cotton by native textile fibres for mechanical surface treatment in the field of technical textiles
(Short: SustainPol)

Partner: Polierscheibenfabrik G. A. Spaeth eK, Aachen

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Mission Statement:

Polishing as a surface treatment technique is an essential process step for a large number of different materials and components. In polishing, the surface of a component is mechanically processed, which changes the topography of the surface. The aim of polishing is to produce components with high reflectivity and high gloss. In this way, the optical and technical "value" of the component required by the customer is achieved. A common polishing process is polishing with polishing paste and a textile polishing slide. A polishing paste is applied between the rotating polishing wheel and the surface of the component. The polishing process is achieved by mechanical and thermal effects. Mechanical polishing is a multi-stage process. The polishing result depends, among other things, on the properties of the polishing wheel, such as fibre material selection and yarn structure. Polishing discs are currently made of cotton, sisal or coconut fibres, the first two of which are of the greatest market relevance.

The current market dominance of cotton polishing discs is due to the low price of cotton. These advantages are counterbalanced by some **disadvantages**. These are, **environmental damage due to long transport distances**, **short service life** of the polishing wheels and **long cycle times** of the entire process due to **multiple iterations** during polishing.

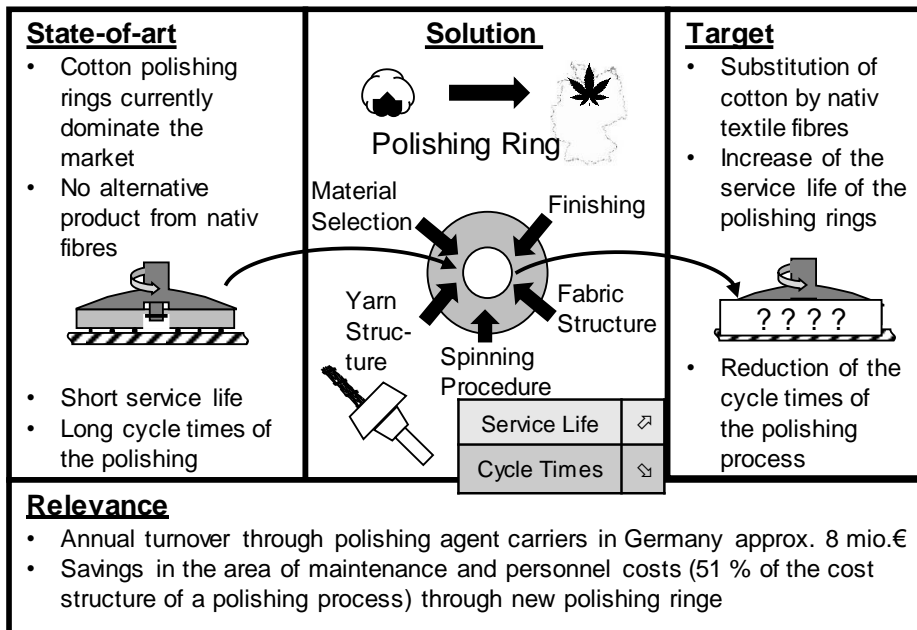
Therefore, the aim of the project is the development of a new type of polishing wheel made of domestic hemp fibres. The new polishing wheel should enable an increase of the service life and a reduction of the number of required polishing steps with unchanged polishing quality compared to conventional polishing rings.

Solution:

The cotton is to be substituted by a suitable native fibre (hemp). By means of **open-end/rotor spinning** processes, yarns are to be produced from **cottonized hemp**. For this purpose, the commercially available rotor spinning machine for cottonized hemp must be adapted. Fabrics and subsequently polishing discs are to be produced from the developed yarns. Finally, polishing tests with the innovative polishing discs will be carried out on components and compared with the benchmark in terms of service life and polishing results.

The innovations of the novel polishing discs consist in the choice of material and in the combination between the fibre material and the chosen spinning process. Hemp fibres are currently not used in the field of polishing wheels, although they offer advantages with regard to provenance and mechanical properties of the fibres. Due to the fact that hemp can be **cultivated in Europe, security of supply** can be guaranteed and CO² emissions can be reduced due to **short transport distances**.

Central figure:



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