



## **Coating of recycled PVB from automotive glass on textile surfaces and yarns**

The aim of the CarPVB project is to evaluate the possible uses of recycled PVB (r-PVB) in various textile coating applications and to compare the resulting coatings with conventional textile coatings (PU, PVC). In this sub-project, the focus was on the coating of yarns from aqueous dispersion and from the melt.

PVB is a highly hydrophobic polymer, so the use of tensides is essential for the production of aqueous dispersions. The combination of polysorbate 20, ricinus oil and triethylene glycol was able to stabilize a 15% PVB dispersion. Furthermore, commercial aqueous dispersions of r-PVB are available and were also investigated. In addition, r-PVP pellets were dissolved in ethanol and coated. As a result, it was shown that it is possible to coat yarns using these processes and that the individual filaments in the yarn are completely covered by the coating compound.

In the following stages, the r-PVB coating agents were additionally functionalized with UV absorbers and effect pigments. In the case of the metallic effect pigments, the abrasion resistance of the material was significantly improved by adding an isocyanate crosslinker.

For extrusion, various r-PVB types were additivated, for example with UV absorbers or plasticizers, by first dissolving the recycled substrates in ethanol and then adding the additives. Ethanol was then removed and the resulting solids were used in a modified laboratory extruder (Filabot) to coat yarns. A yarn feedthrough was added to the existing extrusion nozzle so that the yarns could be coated continuously.

The functionalized yarns were processed into textile surfaces in order to investigate the influence of the coating on the finished textile. A sun protection textile was used as a demonstration application.

## Background

Polyvinyl butyral (PVB) is used for applications that require strong adhesion to many different surfaces with good optical transparency. For this reason, PVB films are used, for example, as a protective film in laminated glass (e.g. motor vehicles).

Large quantities of PVB waste are produced worldwide by the disposal of such used glass. For reasons of environmental protection and rising disposal charges, a separation process exists to separate PVB from glass. In Europe, some criteria for priority waste streams, such as glass, have also been defined (Regulation EU N°1179/2012). The necessary recycling of glass generates a large amount of recycled PVB (r-PVB). While recycling is an established process, the recovery of r-PVB is not yet sufficiently advanced.

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