

## Impact of base substrate on perceived and measured surface properties

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### Abstract

As a part of a demonstrator project, model materials were manufactured to separate surface properties from bulk properties on packaging performance. The purpose of the study was to highlight how different base substrate and surface treatments might influence packaging performance from a holistic perspective, rather than giving detailed information about single parameters. Information from the project will give input of how to optimize board design to improve consumer experience of the final product.

Three-ply sheets with similar thickness were manufactured using different compositions of softwood kraft pulp, eucalyptus kraft pulp, and softwood CTMP (CTMP). The bending stiffness was varied with different furnish composition in the different plies and by varying the thickness of the plies. The boards were then coated in laboratory bench coater to achieve different surface properties.

The coated samples were printed in an IGT F1 laboratory printer and focus was on print mottle and print density. Print quality was influenced by compressibility, surface topography and ink absorption. Impact of compressibility and surface topography was studied using different board properties. Absorption was studied using coating layers with different pigment compositions.

Perceived grip stiffness was both influenced by the stiffness of the board and the friction of the surface. A slippery package is generally perceived as less stiff during gripping than a rough package. Boards with different bending stiffness and friction properties were used to give an understanding of the importance of the two properties for the final consumer experience.

Impact on converting on packaging performance was studied using samples coated with starch-PVOH barriers with different mechanical properties. The samples were creased, and the impact of creasing on the failure of barrier layers was analyzed. Different board types were used to highlight the influence of different load cases on the surface layer, e.g. shearing or tensile strains.

LCA analyzes was used to compare the environmental impact of the paperboard qualities and different coatings and related to packaging performance from a holistic perspective.