**TITLE:**

## Development of powerful technologies for master forming and shaping to produce innovative packagings from renewable raw materials

### Background/Problem area

The packaging is one of the important steps in distribution of different produced goods. The goods are saved and labelled by a packaging and the distribution costs and the sustainability is influenced by the packaging materials and converting processes. The industry needs attractive packaging processes and a cost-saving use of recyclable materials.

Deep drawing of paperboard might be such an attractive process. But limited material properties of paperboard and a low level of knowledge of the paper drawing process prevent yet a broad application of it in the paper converting industry. The development of a better drawable paperboard material and its use in a well researched drawing process meant to produce cost-saving, recyclable, and sustainable packaging's. This problem area will be solved by a cooperation of three research institutes: Professur Verarbeitungsmaschinen/Verarbeitungstechnik der TU Dresden (TUD-VAT), Professur für Papiertechnik der TU Dresden (TUD-PPT) und Papiertechnische Stiftung, Institut für Zellstoff und Papier Heidenau (PTS-IZP).

### Objectives/Research results

The project aims on the development of knowledge of the deep drawing process and 3D shaping of paperboard and the influence of paperboard material properties on it. The research work is divided in three main steps to find out:

- which material testing parameters describe the deep drawing behaviour of paperboard,
- how the result of 3D-shaping of paperboards depend of the different deep drawing process parameters.

New fibre based paperboard materials with optimised deep drawing properties for complex three-dimensional packagings shall be develop on basis of this knowledge.

On basis of commercial produced paper boards were tested how the drawing parameters depend of the investigated mechanical board properties. At PTS all the mechanical standard tests and DMA-analysis (Dynamic Mechanical Analysis) were investigated. These results were supplemented with the results from TU-VAT and TU-PPT. It was found the no general reliance's were watched between the drawing parameters and the mechanical properties of board. You can get well drawing 3D-cups as well from a mechanical strong board as a not so dense weak board. But in each case the drawing parameters had to fit to the mechanical board parameters.

To find an explanation for the watched facts, systematically tests were started to produce well defined paperboards. By variation of the paperboard receipt, the refining conditions in stock preparation, and the application of different additives it will be shown, how the quality of the drawn 3D-paperboard cup is influenced by these parameters and how will you find out the useful drawing parameters for it.

### Application/Economic benefits

The most interesting application areas of 3D-shaped packaging products will be in the paper converting industry. Many food and small technical products are packaged in different folding paperboard or in plastic boxes now. Either the productions of folding boxes need several production steps like e. g. punching, embossing, folding, and gluing to get such a box or a 3D-shaped box must be formed by using of a plastic material which is not sustainable and limited recyclable.

The economic benefit of paperboard deep drawing is the one step 3D-shaping process and a better yield of used recyclable and sustainable paperboard material.

**Period of time: 01.06.2012 – 31.05.2014**

### Remarks