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**Research area: Product aims**

Paper, paperboard and board // Graphic papers

**Key words:**

Paper coating, matt papers, markings, nanotechnology

**TITLE:**

## Coating surfaces of matt finished papers with high resistance to abrasion and markings.

### Background/Problem area

During converting or handling of matt or semi matt finished papers glossy areas (so called markings) can appear on the surface of the pigment coating which can strongly reduce the optical properties of the final product. Abrasion and markings appear often during the following processes:

Format cutting, i. e. on the winder and sheet cutter

Web and/or sheet transport in printing and converting processes as well as through the

Final usage by customers

Responsible for the formation and structure of markings are more or less aggressive contacts between the paper surfaces itself or between the paper surfaces and parts of the transport elements in the machinery. The formation of markings is highly detrimental because it is often connected with an increase in maculature and customer complaints. At the moment all available countermeasures lead not to satisfying results. In particular problems with the touchiness of the surfaces resulting from the final usage by customers cannot be solved satisfactorily.

### Objectives/Research results

The aim of the research project is to reduce surface markings of matt and semi matt finished, pigment coated papers. Especially during format cutting, converting and printing similar web speeds and similar sheet handling speeds should be achieved as in the case of gloss coated papers. Furthermore the formation of markings during the final use by customers should be minimised.

Based on a conventional abrasion tester (Prüfbau Quartant) and a gloss scanner an image analysis procedure was developed for measuring the sensitivity of paper samples for surface markings.

Using this method the protective effects of coating formulation based on nanoparticles (silicium dioxide, aluminium oxide and zirconium dioxide) were investigated in the laboratory and pilot scale. The formulations are applied in an additional thin layer (about 2-4 g/m²) upon the surface of two matt coated papers. Up to now the following results could be achieved:

The sensitivity for markings could be reduced significantly using nanoparticle protective coatings. Silicium dioxides were among the most effective nanoparticles.

But effects are dependent on the surface composition of the matt coated paper as well.

Gloss was affected only marginal.

Whiteness and opacity were also affected rather little.

Ink setting, mottling and picking resistance were determined in the laboratory and showed that printability in offset printing could be guaranteed.

Due to the additional nanoparticle layer on top of the papers abrasion effects in cutting were slightly enhanced.

### Application/Economic benefits

The results of this project should have a positive economic influence on all industrial sectors along the value chain of print products. They can perform important contributions for the formation of new business fields along the value chain, namely

Increase in productivity of paper finishing, format cutting, converting and printing of matt papers through surfaces with higher resistance against abrasion and markings.

Preventing material and human resources in printing and converting of matt finished papers through the reduction of customer complaints.

Higher attractiveness of print products for consumers via a resistant, matt coated paper surface.

New devices and methods for testing the resistance of paper surfaces against markings which can be used for quality control.

**Period of time: 01.03.2010 – 30.06.2012**

### Remarks

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