

Research Institute:

PTS Heidenau
Pirnaer Straße 37
01809 Heidenau

Head of the research institute:

Dr. Frank Miletzky

Project leader:

Dirk Fiedler

Tel: 03529 / 551-669

Fax: 03529 / 551-899

E-Mail: dirk.fiedler@ptspaper.de

Internet: www.ptspaper.de

Research area: Product aims

End products made of paper, paperboard and board // Other

Key words:

Titanium dioxide, dispersing, coating, functionalisation

TITLE:**Increasing the opacity effect of TiO₂ by specific modifications of the pigment****Background/Problem area**

Decor Papers are Specialty Papers for surface finishing of wood materials. In the area of specialty papers, the decor papers are due to the continuously growing applications on the papers with the highest growth rates. Due to the high claim the highest optical demands are placed on the decor paper. For optimum printability requires the paper a very good formation, smoothness and dimensional stability. The resin impregnation requires an even penetration of the resin in the paper. Prerequisite for successful application is sufficient strength of the paper web.

Decor paper as part of a multi-layer laminate characterized in particular its visual appearance. In bright decor paper grades, titanium dioxide is used as a filler to achieve the required level with regard the opacity and whiteness. These basic quality requirements to the decor paper can be achieved only by using high bleached quality pulp. The distribution of titanium dioxide in the paper plays a crucial role for its visual appearance.

In contrast to most other species is the decor paper, is the pulp not the largest cost factor, but the titanium dioxide. With a market price of 2,300 €/t and an amount of up to 40% in paper costs exceed the amount of titanium dioxide to the pulp.

Objectives/Research results

The aim of the project is to achieve a reduction of TiO₂ in the decorative paper. This will be ensured through better distribution of titanium dioxide pigments in the paper body. A better distribution is achieved by effectively prevent the agglomeration of titanium dioxide pigments. For this purpose, a screening of different methods are performed, which are tested on both their profitability and also on their functionality. Among the angewandeten methods:

- steric stabilization, using fixed bond
- Major pigments as a carrier
- TiO₂ composite spheres as a pigment

It should be noted that the specifications are respected for a decorative paper. The wet strength must be maintained. A graying due to the use of modified pigments should be avoided. The impregnation of the paper should not fall. The light fastness must be preserved and the wet opacity as possible should be increased.

Application/Economic benefits

The primary benefit of the developed method is the introduction of modified titanium dioxide pigments for cost reduction of decorative papers, preserving their opacity. This results Decor Papers with a significantly reduced proportion of titanium dioxide with the same opacity or decorative papers with the same content with a much higher opacity.

The enormous investment in research and development in decor paper manufacturers during the last years show the desire to develop new specialty papers. An innovative product that enables a significant increase in the opacity, while retaining the essential qualities of paper, or a reduction of expensive titanium dioxide content in the same opacity permits should have excellent market entry opportunities. The modified titanium dioxide pigments should bring significant cost advantages in the production.

After a systematic investigation of the necessary equipment and process parameters at pilot scale can be a rapid technology transfer into industrial practice. The official proof of technical feasibility by becoming aware of reference products should be implemented quickly as possible.

Period of time: 01.10.2010 – 30.09.2012

Remarks

The research project IK MF 100025 is being funded by the German Federal Ministry of Economy and Technology (BMWi).