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Research area:

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

Key words:

Print, printability, mottling, striking, pick

TITLE:**Development of suitable laboratory test methods for improved communication between printers and paper and ink suppliers****Background/Problem area**

The offset printing process is a rotative reproduction process using unilevel printing forms and creating images via the differences of wetting properties during a competition of aqueous (fountain solution for non-image areas) and oily liquids (inks for image areas) simultaneously fed to the printing form. The transfer of the image from the printing form to the substrate is of indirect nature using a transfer cylinder carrying an elastomeric rubber blanket (and therefore to offset the image). This process is bringing together a very complex combination of materials which can be made to match only under very strict conditions. Under pressure of ever increasing demands on speed, quality and diversity of printing materials the tolerances in all parts of the production chain have been reduced and production of the different materials has to conform to very strict specifications.

Due to the smaller allowed tolerances in the final product there is a requirement for a better specification of the different materials down the chain. To reach this, test and evaluation methods for the different materials need to be developed, starting with the highest cost section: the substrate, to be able to specify according to the specific needs of the printer for the specific purpose of the job. All aspects of the image reproduction on the substrate (this research will deal with paper substrates only) are captured under the term printability.

Objectives/Research results

The purpose is to develop reproducible methods to test the relevant paper properties for printability and image reproduction in the printing process. The properties covered in this research are mottling, striking-ink setting and pick. This research will be limited to papers used in sheet fed offset printing.

When evaluating the actual condition of technical and human resources of the partner laboratories were found that the homogeneity of test prints was inadequate in part. Four round-robin tests were done including the properties pick, print penetration and homogeneity. Especially for homogeneity but also for the other two round robin tests were found large differences within individual laboratories. It was necessary to test the repeatability of test print results within the individual laboratories and to evaluate. Previously unexpected factors influencing the print quality (such as the type and condition of the printing plates and the backing of the print paper in the test printing machines) have been identified additional. Appropriate test specifications were developed, selected test materials prepared, carried out the tests and the results were evaluated thoroughly.

New test methods have been developed for the properties mottling, striking in/setting and pick. The proposed methods were critically evaluated, in joint work completed and upgraded. The project partners evaluate the quality of the developed methods and the reproducibility of test results. The benchmark tests were performed for the method striking in/ setting, dry pick and ink trap mottling. The material properties of the collected benchmark papers were measured.

Furthermore with the analysis of primary parameters influencing the test results (like printing pressure, printing speed, ink film thickness was begun. In addition, secondary influences like temperature, humidity and cleaning agents and their relation to the printing results have been considered.

For printing trials in the print shops was a specific test form designed to show as much as possible the affects to be investigated in the developed test methods. The transferability of laboratory test printing results to industrial processes was studied and verified by means of two full-scale printing trials in Munich and Platin (Belgium). However, the results were not sufficiently in agreement, due to the numerous influences on industrial printing presses many of which could not be kept constant during the trials. This requires a significantly more extensive data base

Compared to the trials on full-scale presses, the paper-ink combinations were considerably more sensitive in terms of mottling, picking and ink setting properties when tested on lab-scale.

Application/Economic benefits

Based upon these multiple new test methods an improved communication between the printers and paper and ink suppliers will be possible. The tests will result in specific parameters for these printability issues, parameters that can easily be interpreted by all parties.

A focus is laid on test methods that can be used on printability testers, which can be used under well specified conditions and will return a measured value. The outcome will be beneficial to all parties involved: both printers and their vendors (paper, machines, ink and other consumables). With the developed test methods it will be easy to check the paper properties for one of the three printing problems.

Period of time: 01.07.2010 – 28.02.2013

Remarks

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