

**Research Institute:**

PTS Heidenau  
Pirnaer Str. 37  
01809 Heidenau

**Head of the research institute:**

Dr. Frank Miletzky

**Project leader:**

Dr.-Ing. Rainer Klein  
Tel: 03529 / 551-686  
Fax: 03529 / 551-889  
E-Mail: rainer.klein@ptspaper.de

Internet: [www.ptspaper.de](http://www.ptspaper.de)

**Research area: Product aims**

Paper and paperboard // graphic papers

**Key words:**

Paper evaluation, measurement technology, measuring procedures, offset paper, offset printing, print results

**TITLE:****Modern measurement technologies for characterising the print results achieved with offset paper****Background/Problem area**

The quality of a print product results from the interaction of numerous paper- and print-related parameters that often interact with one another. The complexity of this interacting system still does not allow a reliable prognosis of the behaviour of the paper during the printing process nor the quality of the finished print. This deficit means that ultimately the finished printing product and the evaluation of it will always be necessary to optimise existing paper grades as well as to develop new paper types.

Nowadays, printing paper is characterised by a number of fundamental properties. The many attempts to find relationships between these characteristic values and the actual paper properties that are relevant in converting have thus far produced predominantly unsatisfactory results. This is caused on the one hand by the definition of the converting-technical requirements, which are not always clear, and on the other hand the fact that the currently available measurement technologies have been neither developed nor optimised for these purposes and thus come up against limiting factors.

The wide diffusion of the methods of conventional characterisation are based on the advantages offered by a comparatively simple, robust technology, the user-friendly ease of operation, the availability of (sum) parameters and the relatively low acquisition costs for the instrumentation. In the past, numerous standards have been worked out on this basis and the results have been stored in large, robust databases. In view of the growing requirements on quality and consistent quality, however, many of these measurement technologies are only partially suitable or have already reached their limits. Modern computer-assisted measurement procedures have been developed in the past few decades. These make improved and in some cases innovative evaluation of paper possible, thus rendering them particularly helpful when troubleshooting converting problems.

**Objectives/Research results**

The project objective is to determine the print-relevant properties of offset paper and their quantification by means of modern measurement technologies as the basis for selective product optimisation and modelling of the interaction that occurs between the paper and print results.

A questionnaire intended to collect paper-related printing problems was worked out and sent to print shops. It is currently impossible to make any definitive statements due to the inadequate response rate. Four industrial papers were obtained that had varying ink setting behaviour. They, together with nine pilot-scale coated papers, form the basis for the print trial in August 2013.

In addition to conventional paper evaluation, comprehensive studies have been conducted to determine the inner and outer structure of the paper. The focus was on topography, coat distribution and the pore system. Similarly, attention was given to the ink setting behaviour of liquids (wetting, penetration). This was based on the one hand on the dynamic penetration measurement by ultrasound and on the other hand by a HFC measuring system that was used. Work has begun on the printing ink penetration of ion beam etched paper cross sections with high resolution (FESEM).

Future work will aim at evaluating the print samples and the determination of possible correlations between the paper properties and the print results, the focus being on the interactions (print-related conditions, paper properties).

**Application/Economic benefits**

The economic effect of the envisioned research results is being awaited on a cross-sector basis by the frequently small- or medium-sized offset printers and manufacturers of measuring equipment as well as by the paper industry. In concrete terms, the findings are to result in an improvement of the properties of print paper that are relevant for converting. This is intended to reduce the print-related problems, thus achieving a reduction in the number of complaints or a reduction in the costs of makeready waste. In this context, the results will also lead to a sustainable diffusion of modern, as yet non-established measurement technologies in the paper industry, thus strengthening the economic situation of the manufacturers of measuring equipment.

**Period of time: 01.07.2012 – 30.06.2014**

**Remarks**

Research project IGF 16902 BR is being funded by the Federal Ministry for Economy and Technology (BMWi). Our funding partner is Dresden Technical University, Professorship of Paper Technology.