

Food for Thought on Printing, Gluing and Finishing

From October 24 to 26 last year the organizers (Dr. Michael Gerstenberger and Stephan Hinterwaldner, MKVS GbR) of the Munich Adhesives and Finishing Symposium assembled the who's who of the industry to three days full of food for thought on printing, gluing and finishing. Aside the exciting programme there was plenty of time for the more informal exchange of news in the conversations buzzing during the breaks or in the evenings. Once again the number of participants was up to the previous years' levels and in the breaks they kept the exhibitors (Erichsen GmbH & Co. KG, Kienzle-Prozessanalytik GmbH, Evonik Industries AG, Lion Consult, Gala Kunststoff- und Kautschukmaschinen GmbH, Rocholl GmbH, Dr. Höhle AG, Sam Sungan Ralf Pagendarm GmbH, INATEC GmbH and Hochschule München) pretty busy answering questions to their products and services. The programme covered innovations, process control and various issues regarding printing, such as standards, or printed electronics, or problems solved in finishing and gluing, with a focus on adhesives, application technology and sustainability. As is already customary from previous events, time was set aside for questions and answers to this input each day prior to lunch and again before the end of the day. The panels were chaired by experts in their fields: Michael Schmalz from Kroenert in Hamburg, Dr. Ralf Rönisch from Coroplast in Wuppertal and Dr. Hermann Onusseit, from Henkel in Düsseldorf to mention only a few.

In all continuous production processes such as printing, gluing and finishing, process control and optimization at a high standard are required 24/7. Hans Örley from Dr. Schenk in Planegg, Germany, showed how optical inspection systems can provide superior results compared to manual control.

INNOVATIONS. «The secret of all inventors is to consider nothing to be impossible»¹. True to this motto the innovations presented covered a wide range of topics, extending from cleaning to curing or sustainable packaging solutions.

Dr. Heribert Hohmann from Kienzle-Prozessanalytik in Flensburg, Germany, discussed how using laser induced fluorescence spectroscopy continuous monitoring is possible inline, online or offline, to guarantee that a substrate is sufficiently free of contaminations to permit a perfect result after gluing, finishing and printing.

Oliver Starzmann from IST METZ in Nürtingen, Germany, presented UV-LEDs as an innovative UV-solution with clear benefits compared to classical UV systems. Petra Burger from Dr.



Höhle in Gräfelfing, Germany, reported on her experiences with this technology.

How to generate an innovative substrate to replace mineral oil based plastics films by harnessing nature to generate packaging solutions was shown by Joachim Janz from Innovia Films in Bückeburg, Germany, in his presentation of Natureflex™-films.

PRINTING. Customers and printers require standards to facilitate their communication, appropriate equipment to provide the product ordered, process controls and innovations validated prior to their implementation. In his paper Prof. Dr. Martin Dreher from DFTA Technology Centre at the HdM, Stuttgart, Germany, specified the Process Standards his institution has developed to put all parties concerned on the same page in their communication on packaging printing quality. Mainly this entails generating colour profiles for each printing condition, which would then be printed in a colour strip along side of the actual job.

The more and more popular reproduction procedure using «digital» plates often leads to problems. During data transfer exposure of the print relief to ambient oxygen is responsible for insufficient crosslinking at the borders of the exposed area, which causes dot reduction and according lower print quality. Dr. Uwe Stebani from Flint Group Flexographic Products in Willstätt, Germany, showed new UV-exposure technologies for photopolymer printing plates to improve this problem in image reproduction.

Dirk Lange from AVT-Advanced Vision Technology in Hamburg, Germany, introduced a solution to simplify standardization that enhances productivity and reduces cost. It involves automatic process and quality control as well as spectral photometric inline colour measurement.

¹ Justus von Liebig

Simulating production conditions in a lab is often a problem, where inert conditions at production speed need to be generated to obtain a viable result, as in simulating UV-light curing e.g. in printing processes. Dr. Georg Bolte from Bolte Consulting in Halle/Westfalia, Germany, presented his solution. It is based on a cylinder with a slit opening rotating around an UV lamp. The cylinder's rotating speed simulates the transportation speed of the substrates for >200 m/min. A repeated turn of the cylinder is used by the comparison of several numbers of UV-lamps. The separated, inert chamber makes the precise adjusted oxygen content between 100–2000 ppm O₂ during the UV-cross-linking process possible.

GLUING. Various motivations are behind new developments in the adhesive industry and the adhesive application technology: saving cost, improving an adhesive's properties, generating new products, and last but not least, protecting the environment.

Since the prices for raw materials for adhesives are raised time and again the industry is on a quest to set off this disadvantage by coming up with technology permitting to apply less adhesive without forfeiting adhesive bonding or any of the other properties a customer requires. Be it the die design, as shown for hot melts by Michael Brune from Inatec, Langenfeld, Germany, and in general by Harald Döll from TSE-Troller in Murgenthal, Switzerland. Be it the application method, curtain coating or bead-coating mode, as explored for dispersion adhesives in the paper by Dr. Wolfgang Neumann from Kroenert in Hamburg, Germany, assisted by Jérôme Malaise from Hochschule Munich, Germany.

Technical innovations such as OPV or OLEDs, where application weights of 15–50 Nm are required, are an altogether different motivation to reduce application weight. As the lively panel discussion on «printed electronics» showed, here well-trodden paths will not lead to the desired result and thinking out of the box is the order of the day. The adhesive to be applied too bears challenges as Dr. Klaus Noller from the IVV Fraunhofer-Institute for Process Engineering and Packaging in Freising, Germany, showed in his presentation of novel barrier adhesives applied in multi-layered high-barrier laminates such as OPV.

One of the most important and at the same time most flexible ways of supplying adhesives for further process chains is in the form of pellets, or granules. Michael Eloo and Helmut Schöttner from Gala Kunststoff- und Kautschukmaschinen in Xanten-Birten, Germany, and Duane Booth from Gala Industries in Eagle Rock, VA, USA, walked the audience through the established and new solutions for the production of such pellets or granules.

Although solvent free UV-curable acrylics were introduced into the adhesives market with the goal to replace solvent based acrylic PSA systems already some 20 years ago, so far, due to their limitations such as restricted compatibility with tackifiers, a limited ability to bond to low-energy surfaces and curing problems at high coat weights resulting in poor shear performance, this goal has not really been reached as they have only captured a small albeit steadily growing part of the market. Dr. Christoph Timm from Novamelt in Wehr, Germany, introduced his company's new developments opening new application opportunities for UV-curable acrylic HMPA.