

Looking to the future of adhesives and other pressing issues

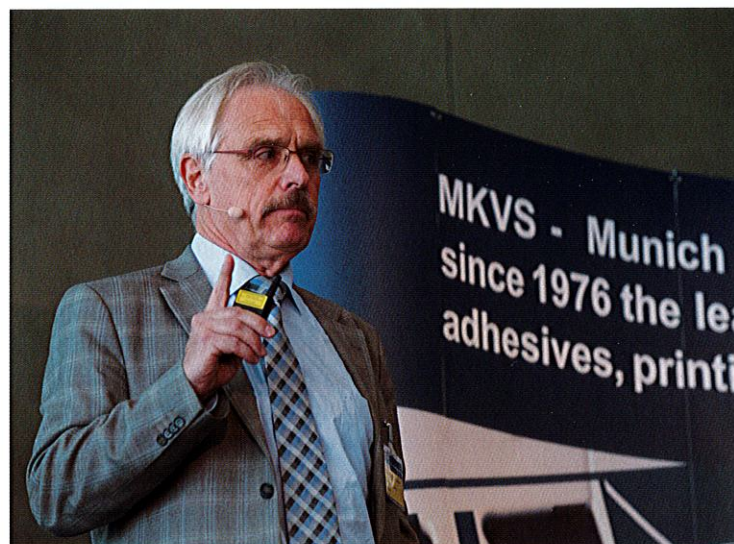
At the annual networking event Munich Adhesives and Converting Symposium (MKVS) product and machinery producers, formulators, users and end-consumers convened from 23-25 October 2017 to bring each other up to speed on all that is new and newsworthy regarding solvent based, hot melt, waterborne and reactive systems in relation to gluing, converting and printing. In short, the event in Munich, Germany, was an industry reunion for most of the 250 participants from twelve different countries. Food for thought – and plenty of discussions – were provided by the 29 talks given. A tabletop exhibition rounded out the informative offering. The event started out with a short silence to commemorate Dr Michael Gerstenberger, the event's co-organizer, who had passed away around half a year earlier. In his speech to commemorate him, Mr Stephan Hinterwaldner, also pointed out his plans for this event: he and his team are continuing the focus on both adhesive innovations and innovations in the machinery used to apply them and in the downstream process – quite in the vein of the event founder, Prof. Knut Nitzl.



Mr Stephan Hinterwaldner explains his future plans for the event.

LOOKING TO THE FUTURE. Prof Dr Martin Dreher from The DFTA-Technology centre painted an image of where in 2050 he believes packaging printing to have developed: It's all digital, right? In his eyes, packaging printing will not be forever. However, until then he expects both flexo- and digital packaging printing to flourish. The draft for an EU-Ecodesign Directive – is this really the way to save the environment? Dr Frank Onusseit from Onusseit Consult-

ing, explained the ramifications: electronic devices such as computers, displays and the like, would need to be assembled using double-faced adhesive tapes – to make it easier to recycle components! His paper showed that while such a severe regulation may not be passed to the letter, the adhesives producing industry will need to pull up their socks and come up with more recycling friendly solutions.



Dr Frank Onusseit, Onusseit Consulting, cautioning the adhesive industry with regards to the EU's ideas on how to make electronics more recyclable.

CONVERTING MACHINERY, EQUIPMENT AND PROCESSES. Michael Brune from SM-Klebetchnik, Heinsberg, Germany, shared his insights in how to save hot melt adhesive without affecting either strength or function of the adhesive compound: when less is more, this also pertains to equipment prices. A sheet die for all-over, contactless hot melt application need not be elaborate and complicated to work well. Innovative ideas help to achieve what is necessary to accomplish an all-over hot melt film of 2 g/m² even without a great number of gear pumps or switching modules. For instance, using an exchange unit supplied in a storage and transport box saves set up time, space and money when processing several different adhesives in one melter. Cooling the drum floor and the melting plate quickly cools the adhesive residue in the container. Release liner previously inserted into the adhesive container, permits removal of residual adhesive from the adhesive drum to the melting plate as a block after cooling. These are examples of what a big difference a small change in technology can make.

In the aviation industry, it is all about saving weight, which begs the question how to mass-produce epoxy resin-based pre-pregs. Marco Wogram from Kroenert, Hamburg, Germany, discussed producing epoxy resin films in the range of 50 to 100 Pas using roller-coaters. His analysis of such systems and upon comparing them to theoretical data showed that the most important issue, which still needs work, is the equal distribution of coat weight.

Dr Peter Barth from CreativeNetworkConsulting in Celle, Germany, compared the dispersion to the thermal lamination process. He pointed out that in spite of this process often being referred to as wet lamination, it is actually a dry process: the adhesive is coated onto a film, dried by air jet and heating cylinder and laminated onto the supplied overlapped sheets. In the separator, these sheets are separated using applicable technologies. These dispersions are suited to medium to high print runs and instances in which the technology is very complex and high flexibility is required. In thermal lamination, a heating cylinder guides a thermal film at a temperature of approx. 95 to 110 °C. Hereby, the adhesive is activated, and not liquefied. At the moment of the lamination, the coating takes place under high pressure with the overlapped guided sheets. Afterwards, the individual sheets are separated, comparable to dispersion lamination. The adhesive cools down and the compound is immediately ready for further processing. Thermal lamination is appropriate for smaller to medium print runs in the production of books or products on demand. Dr Barth concludes that both systems have their place in the market and, depending on the requirements profile, they are sometimes even also used as supplements so that there is considerable potential for future development for both systems. Prof Dr Dirk Burth from the University of Applied Sciences in Munich, Germany, explained the aspects of coating penetrating into paper webs and its influence on the coating quality.



Speakers on the podium with Torsten Remmler, Dr Gene Plavnik, Prof. Dr Durst, Prof. Dr Dirk Burth, Dr Peter Barth, Dr Hermann Onusseit and chair Frank Henke

Prof Dr Franz Durst, FMP Technology, Erlangen, Germany discussed how the paper industry could save energy – theoretically and practically. His approach was that the industry needed to introduce a new drying technology: such as the diffusion optimized convection drying technique. He showed that it could reach high drying rates, which allow the construction of dryers for the paper industry with considerably shorter drying length and thus savings in energy consumption. Gene Plavnik from HTI – Heat

FURTHER PROGRAMME-HIGHLIGHTS WERE:

- How to measure the viscosity of adhesives properly (Malvern Instruments)
- Achieving gapless adhesive coatings, zero defect production and the best results by inspecting optical material properties (Isra Surface Vision)
- Inline inspection of surface state before adhesive bonding (Automation W+R)
- Rheology to improve the operational settings as a predictive practice to avoid off specifications and optimize the packaging process (Mapei – Tile Adhesives Department)
- Characterization of odorants in acrylate adhesives (Fraunhofer Institute for Process Engineering and Packaging IVV)

Technologies IC, Atlanta (Georgia), USA, showed how his completely different approach to drying, using acoustic heat and mass transfer, was helping the technical tape production facility in the EU, which was working with this system since 2016, save energy. Dr Richard Plenderleith from Lambson, Wetherby, UK, presented several formulation strategies, using commercially available photoinitiator products, to overcome common LED curing problems. He explained some of the new photoinitiators and photoinitiator systems in development as a use of LED lamp technology becomes more widely spread.

ADHESIVES AND PRINTED ELECTRONICS ISSUES. Wolfgang Mildner from MSWtech in Stein, Germany, described the role adhesives play in achieving thin, flexible, and lightweight functional components and systems. Various adapted roll-to-roll and sheetfed processes such as offset, gravure or inkjet printing are employed to apply the adhesives. His talk provided an introduction, an overview of the state of the art of the technology and an outlook to existing and future applications of adhesives for wearables in e.g. healthcare applications according to the OE-A roadmap (organic and printed electronics association). Dr Klaus Noller from Fraunhofer Institute for Process Engineering and Packaging IVV, Freising, Germany, presented the latest generation of self-adhesive high-barrier films for the encapsulation of flexible Organic Photo-

- VOCs and odour characterization of some samples of hot melt adhesives by GC-(Sniffing)-MS (Odournet)
- Latest developments in synthetic waxes for water based inks (Honeywell)
- Moisture-curing acrylates for the use in PSA tapes (Lohmann)
- Coatable pressure sensitive adhesives based on acrylics that are solvent-free and UV-crosslinkable at room temperature as an alternative to commercial UV-crosslinkable acrylic hot melts (West Pomeranian University of Technology Szczecin)
- Latest developments in acrylic UV-hot melts (BASF SE)
- Stabilized and ready-to-coat water based acrylics (Henkel)
- Waterborne PSAs for clear filmic labels and graphics (Synthomer Germany)
- New versatile polymers as key to innovation (Eastman)

voltaics (OPVs), which the Fraunhofer POLO institutes have developed in the recently finalised FP7 European, funded project, SMARTONICS. The barrier film developed has reached a water vapour transmission rate of $2 \cdot 10^{-5} \text{ g}/(\text{m}^2\text{d})$ in a roll-to-roll production, which can enable an OPV lifetime of more than 10 years. The Fraunhofer POLO team has produced a self-adhering high-barrier film, by laminating the developed high-barrier film to a self-adhering pressure-sensitive adhesive film. The adhesive film was selected after screening various adhesive formulations according to the criterion that the laminate bond strength on the barrier film remains stable during damp-heat tests (85 °C/85% RH, 1000 hours). Lamination process parameters, such as lamination pressure, web-speed, and web-tension, were also optimized.

AFTER THE EVENT IS PRIOR TO THE NEXT EVENT: This year, the 43rd Munich Adhesives and Finishing Symposium is scheduled for 22–24 October 2018. This year's event will feature aspects of pressure sensitive adhesives: dispersions, solvent-borne products, reactive systems, HMPSA. A call for papers is on-going until 30 April 2018. Selected speakers will be notified by 8 May 2018. As always, the symposium will be held in German and English with simultaneous translation. ↩