3rd Afera Tape College in Brussels

Two Days Of "Spring School"

Gathering more than one hundred attendees from fifteen countries, thereby spanning the scale of nationalities as far as to Turkey and even to Columbia, the 3rd Afera Tape College (April 18 – 20, 2007) exceeded the expectations of their organizers as well as the standards of past years. According to its mission the event addresses such members from the tape and label industry which are either quite new in their respective job and, hence need to become familiar with "what kind of chemistry / technology makes a good PSA material (s)tick", or those who are even too long in their respective occupation so that they feel their knowledge has come of age and requires some refreshment.

The Whole Wide World Of PSA Tapes

Among fourteen lectures in total we particularly recognized *T. Jensen´*s (Jensen & Associates, USA) **Tape Overview** opening the event. The former 3M thoroughbred introduced the audience to all those details important to understand the sometimes difficult world of pressure sensitive materials digging deep into the scientific background, nevertheless, always in a way comprehensible even for those that are not so familiar with scientific details. What will be always worthwhile remembering is the speaker´s explanation of why using PSA tapes: "Because they can be used to accomplish tasks which would be more difficult or impossible without them." A very clear and slightly philosophical definition, indeed, which, nevertheless, perfectly fits any kind of tape applications if looked at in detail.

An introduction to Acrylic Pressure Sensitive Adhesives was presented by *F. Bodino* (Rohm and Haas, France). Outlined were advantages (UV resistance, colour & clarity, chemical resistance), but also disadvantages (low surface energy adhesion, formulation latitude, cost) of this product class. The outline was spanning the complete field of application technologies, starting from the "conventional" solvent based systems to the more modern ones, such as aqueous emulsions and 100% systems, not neglecting some minus marks of the latter, i.e. limitations in polymer composition and high price. Formulation hints were given, likewise useful details of performance properties (adhesion, tack, shear, SAFT) as well as some closer insight into typical applications and an overview of marker size and growth rates.

“Grand (and not so) Old Man” of PSA raw materials *L. Jacob* (ExxonMobil Chemical Europe, Belgium), Afera Technical Committee Chairman, stepped forward onto the stage outlining about **Raw Materials for Hot Melt Pressure Sensitive Adhesives and their Application.** Word was made of hydrocarbon tackifying resins and their influence on SBC´s (styrene butadiene / isoprene copolymers) improving adhesive strength, balancing cohesive vs. adhesive properties, and optimizing a bunch of other important features. HMPSA performance profiles were particularly valued vs. the other “modern”, i. e. environmentally friendly alternative, waterborne acrylics. All in all the author attributes the overall advantage balance being in favour of the hotmelt alternative with such important features like higher (shear) adhesion, lower coating weight, and better recycling performance.

Traditionally since its early days more than two decades ago a particular fascination is emanating from radiation curing. Hence, *B. Lühmann* (tesa, Germany) easily caught the audience´s attention with his contribution called **Use of EB and UV irradiation for controlling PSA tape properties**. After a general description of the nature of interference of both types of radiation with the adhesive formulation and the equipment involved important differences such as the tremendous gap in kinetic energy between UV photons (max 6 eV) and accelerated electrons (up to 300 kV) were demonstrated. Consequently, applying the latter appropriate measure needs to be undertaken in order not do overdo and to avoid undesired side reactions such as thermo-oxidation and embrittlement. Two case studies, i.e. EB cross reduction of molecular weight and subsequent cross-linking of natural rubber in a respective PSA formulation and fine tuning of shear adhesion within one single acrylic based PSA formulation by adapting EB radiation dose rounded off the comprehensive treatise.

It goes without saying: No capable PSA tape without a well-tailored release liner. *J. Pomorin* (Degussa Goldschmidt, Germany) elaborated on that commonplace with his presentation **Selection of the Right Release Liner**. After presenting some break-down figures on the world market of paper and film release materials (30.5 billion m² in total) a list of selection criteria in search of the “right” material were presented. Among these there are kind of application, type of adhesive, desired release level, process parameters, food contact, and – last not least – tolerable cost level. As it turned out a number of influencing factors does affect release performance: type of silicone material, degree of cure, additives, but also the nature of the “partner”, i.e. the adhesive, its chemical nature, coat weight, and technique of application. Furthermore, the different classes of silicones with respect to the nature of their chemical reaction were pictured, among these thermally cured solvent based, solventless, emulsion and UV curable systems. Especially advantages of the latter (epoxy and acrylic) completed the author´s elaborations listing room temperature curing and applicability onto thermally sensitive substrates as well as the avoidance of water loss from the substrate with subsequent shrinkage.

The symposium´s only contribution solely dedicated to application equipment was given by *S. Essing* (Olbrich, Germany) talking **Processing of Solvents and Water-Based Acrylic Adhesives**. Starting with the diverse coating application technologies, knife-over-roll, comma and Meyer bar, (reverse) roll coaters, slot die, curtain coating, screen, (pressurized) gravure and chamber doctor systems were introduced briefly touching their respective pro´s and con´s. The second part of the presentation covered the drying part of the process. Thermal conduction, convection

and thermal radiation are the three dominating modes of thermal energy transport. Outlining respective correlations the author plunged somewhat deeper into mathematical considerations with respect to definition and importance of heat transfer coefficient and flow velocity profiles. Going back into the practice of machine technology two main nozzle concepts were introduced and dryer concepts with TP and CTS nozzles explained. Especially results from the company´s technology centre, e.g. with flotation and multi-zone dryers underlined the real world importance of theoretical considerations.

Most Useful Exercise

Every successful industry last not least thrives from its ability to permanently transfer know-how from those who are well-experienced to those who are still in an early stage of their individual learning curve. The efficiency of this process ensures the competitiveness of a branch and its fitness for meeting future challenges. No doubt, Afera´s Tape College serves this role as a “transmission gear” for the tape and label industry in a close to perfect way. We are looking forward to a fruitful continuation in 2009.

“… an event which seeks to promote a truly dynamic learning opportunity last not least by its numerous lively discussions.” (Lutz Jacob, Afera Technical Committee Chairman)