Current Abstracts for 11th TAPPI European PLACE Conference - Athens, Greece

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Packaging

Session:
Technical Paper

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Impact of the EU REACH Regulation on the Packaging Supply

A new regulation for more effective registration, evaluation and authorisation of chemicals (REACH) in the EU has been in the pipeline for almost a decade. Since the white paper was published in 2001, it has been surrounded by immense controversy and lobbying. But REACH is rapidly transforming into a reality (most probably in 2007) that every manufacturer or downstream user needs to prepare for. The business of packaging is highly chemical-intensive. Chemicals such as polymers, additives, fillers, pigments, coatings, inks and adhesives, are used extensively, and REACH has the capacity to fundamentally change which packaging materials can be used and the cost of the materials. The safety and health goals of REACH are admirable but will increase the paperwork burden of raw material makers and package manufacturers alike. Costs are likely to increase for all, and some raw materials may become unavailable to the industry.

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A Model to Predict the Ability of a Flexible Package to Contain Materials.

Testing the ability of a flexible package to hold or “contain” a material is cumbersome and subjective. This model qualitatively predicts the outcome based on the permeation rate of the material through the sealant and the ability of the contained material to disrupt the adhesive bond. Key factors which affect permeation and bond disruption are discussed as well as the roll of the sealant and the robustness of the adhesive or primer.

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Processing

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Online Quality Control of Polymers and extruded Films

Today in modern Polymer plants an online quality control is done automatically and alarming the operators immediately so that the operators can react and avoid more damage to the final product. This “close loop”-concept also allows a grading of the pellet lot. The Film producers, the customers of the Polymer plants, also use web inspection systems to control their final product quality, the quality of the raw materials and also their process parameters. Between both control concepts exist some interrelationships and also problems, because the environment parameters are different. This relative correlation and the impact for the Polymer and film producers will be discussed with practical examples.

COMMENTS

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Processing

Getting More PERFORMANCE from an Existing Extrusion Coating Dryer

Whether “more performance” is defined as greater line speed, less energy consumption, or higher throughput efficiency, there are a number of improvements and/or adjustments that can be made to an existing

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dryer to achieve these objectives. The primary variables of drying temperature, cross-machine temperature profile, air impingement velocity and air volume are reviewed as to how they influence drying performance and how they can be manipulated to improve the drying quantity and/or quality of any hot air impingement dryer.

COMMENTS

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Machinery

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Modern Extrusion Coating Die Technology

New technology is being developed which may enhance the performance of extrusion coating dies. Processors require extrusion tooling that offers: precise control of coat weight uniformity, trouble-free coating width variation, and the ability to minimize expensive edge trim waste. A novel concept will be presented that improves web stability and helps to reduce edge bead and neck-in effects. Laboratory trial results which demonstrate the potential of this emerging technology will be discussed.

COMMENTS

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7569

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Coating of polyester film with thin wax layers

Special applications require coating of thin layers of molten wax onto thin polyester films. The coating is approximately 1.5 micron thick on a substrate of 4.5 micron thickness. The standards for coating quality and uniformity are high. In the Polytype Pilot Plant we analysed several coating methods. Criteria related to quality as well as productivity, in particular the line speed, have been used for selecting the optimum coating method.

COMMENTS

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Materials

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New Tools for Aroma Barrier Testing

Test methods of aroma barrier and related challenges are presented. There have not been widely accepted methods or specifications for aroma transfer. New tool, KCL AromaBar, has been constructed. This utilizes automatic sampling followed by gas chromatographic and numerical analysis. Model aroma solutions were also developed. This method can be used for flat materials. We also studied effect of base sheet. Aroma barrier of polymer coated sheets can be improved by base paper or board.

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Packaging

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Prediction of WVTR with General Regression Models

In this study, general regression models are used to predict moisture barrier properties of extrusion coated papers in different atmospheric conditions. Basically, water vapour transmission rates (WVTR) of different polymers are affected by three factors: coating weight (or squared mass) of a studied polymer, temperature and moisture concentration of surroundings. Regression models find practical connections between WVTR and these variables making WVTR analysis even more effective in determining moisture barrier properties of studied polymers. Furthermore, by leaning on statistical treatment of experimental WVTR values, a simple mathematical expression can be drawn for WVTR employing all the important factors - temperature, mixing ratio and coating weight – as independent variables.

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Converting

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Clear Barrier at Atmospheric Pressure

The barrier properties of transparent layers deposited on flexible plastic substrates are of interest to many in the packaging industry. Numerous methods have been used to manufacture transparent barrier coatings with varying degrees of success to address evolving environmental laws requiring the reduction or elimination of volatile organic compounds (VOCs), which are the byproduct of curing liquid topcoats. There is also a consumer preference to visually inspect packaged products through packaging prior to purchase. This paper will present new evidence since the 2006 TAPPI PLACE Conference of the potential for clear barrier at atmospheric pressure through the use of plasma processing as integral steps in a composite process for deposition and polymerization of functional barrier coatings. XPS analysis of polymerized film showed presence of silicon, carbon and oxygen in ratios different from the monomer, and in fact approaching a Si:O atomic ratio of 1:2 confirming cross linking effects, and the plasma polymerized organo-silicon films displayed good functional barrier properties without the environmental concerns of VOCs.

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Flame treatment on extrusion-coated Paperboards: What happens on the surface before printing?

Polymer films have low surface tensions and wettabilities due to non-polar molecules on the surfaces. Therefore, to print on extrusion-coated PE-paperboard compounds, there is a need to pretreat the surface to get proper adhesion of the ink. One of the most common treatment methods is flame treatment. Several processes can have an impact on the surface tension and adhesion. This presentation discusses the effects occuring on the surfaces during material processing before printing. Besides the surface modifications due to flame treatment which are the most significant ones, the raw materials, the influences of the rewinder rolls as well as the printing inks have to be considered, too. Also discussed are items which determine the duration of the treatment effect.

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Non-isothermal stability analysis of the film blowing process for non-newtonian fluids by the help of variational principles

The effect of long chain branching in metallocene based LLDPE has been investigated from the film blowing stability point of view experimentally as well as theoretically. It has been found that the introduction of an optimum level of long chain branching may significantly improve the bubble stability.

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Analysis of the free surface instabilities in extrusion/coextrusion flows for metallocene based polyolefins

Die build-up and interfacial instabilities occurring during the extrusion and coextrusion processes, respectively, have been investigated theoretically and experimentally.

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Title: Elongational viscosity in quality control Aspired Category: Characterization of raw materials Authors: M. Stadlbauer, M. Kirchberger, S. Filipe

Several shear and elongational flow experiments are currently used in quality control of resins for high-speed extrusion coating. Beyond MFR and capillary rheology, also data from the dynamic shear experiment such as G' or ç0 are collected and they show excellent correlation with processing stability in terms of maximum draw down and neck-in. However, data of any shear experiment are only of limited value when it comes to comparing different material classes, such as polyethylenes and polypropylenes. For latter purpose, data from elongational devices are preferred. They show better inter-material comparability since they are more close to the fast elongational flow observed in high-speed extrusion coating. For some time, the device of choice for assessing polymers' elongational flow properties has been the Rheotens tester. It offers great reproducibility and excellent correlation with the performance of resins in extrusion coating. Its drawback is the inter-laboratory comparability. With a new extensional stressing device, called SER and outlined in the presentation, it is now possible to measure extensional rheology with high throughput in a very comparable and standardized way. Present paper shows first results on correlations of the results from the SER extensional rheometer with process stability in extrusion coating, based on PE and PP with praticular view on Daploy™ HMS-PP grades.

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'Relationship of Rheological Behavior and Molecular Architecture for LDPE¡¦s designed for Extrusion Coating¡¦

The suitability of a polymer for extrusion coating application is strongly determined by its rheological behavior in the melt. The rheological behavior can be characterized by a number of rheological parameters, which relate to the molecular architecture of the polymer. One such parameter is the zero shear viscosity. For linear polymers there exists a power law relationship between zero shear viscosity and the weight average molecular (Mw) with an exponent in the order of 3.4, independent of the type of polymer. This empirical equation is well known as the Mark Houwink relationship. Long chain branched polymers like LDPE generally do not follow this relationship. In fact most of the time Mw and ƒØ0 are completely independent. In this paper the relationship between zero shear viscosity and molecular architecture of LDPE is discussed.

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Packaging

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Technical Paper

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Protecting the brand while gaining operational efficiencies with item level RFID

* Combining supply chain visibility with brand protection * How to use HF, UHF and barcodes together * Benefits for the whole supply chain

COMMENTS

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Converting

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Technical Paper

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Transparent inorganic barrierfilms

The paper will give an overview about the technology of inorganic barrier coatings. The differences between coating technologies will be described, as well as advantages and applications. The paper will also include the new biodegradable barrierfilms, based on PLA.

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Extrusion

The effects of corona and flame treatment: Part 1. PE-LD coated packaging board

Johanna Lahti Tampere University of Technology, Institute of Paper Converting Tampere, Finland Mikko Tuominen Tampere University of Technology, Institute of Paper Converting Tampere, Finland Abstract The most important function of a packaging material is to shield the

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product inside the package. Extrusion coated paperboard is generally used in food, medical and cosmetic packages. Extrusion coatings give a barrier against water, water vapour, aroma, grease, oxygen, etc. In addition to barrier properties, heat sealability and printability are important properties in packaging applications. From point of view of printing, the dense and impervious structure of extrusion coatings is challenging: printing inks and toners do not penetrate into the coatings. The durability of the printed image is significant, because the image must withstand various converting operations when the package is constructed. The most common method for obtaining good ink adhesion is to oxidize the surface. Surface treatments are used to change the chemical composition, increase the surface energy, modify the crystalline morphology and surface topography, or remove the contaminants and weak boundary layers. Two widely used methods are electrical corona discharge treatment and flame treatment. These processes generally cause physical or chemical changes in a thin surface layer without affecting the bulk properties. Treatments will increase surface energy and also provide polar molecular groups necessary for good bonds between ink and polymer molecules. In addition to printability, surface treatments also affect the heat sealing properties of extrusion coatings. In this study, the surface chemistry of the extrusion coatings has been modified with corona and flame treatments. The effect of corona and flame on surface energy has been evaluated with contact angle measurements. Surface energy has the habit of decreasing with time after treatment. In this work, the decay of surface energy and surface oxidation is followed for six months. ESCA has been used to analyze oxidation and the surface chemical composition. Furthermore, the heat sealing and hot tack properties of the extrusion coatings are evaluated. The aim of this study is also to evaluate printability of extrusion coatings and to map out the role of surface modification in print quality formation. This study has concentrated on digital printing, particularly on dry toner-based electrophotographic printing process.

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Machinery

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Technical Paper

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Low or No cost extrusion coating improvements

The purchase of an extrusion coating line is often the largest single purchase a company will make. With this sort of purchase comes the added responsibility of getting the most out of the equipment. By spending money, the efficiency of the equipment can often be improved through equipment additions and upgrades. This paper will deal more with the many ways improving the line's effectiveness can occur without significant capital investment.

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Converting

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Technical Paper

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Developments in on-line gauging of Complex Extrusion Coating – An update

This paper focuses on the developments in on-line gauging systems for the measurement and control of multilayer product structures manufactured using high speed Extruder/Laminators. Product developments for packaging applications have focused on new materials and multi-barrier layers to impart specific properties. The on-line gauging industry has responded to the challenges of precisely measuring and controlling the new complex product structures through developments in Sensor technologies and advanced process control strategies. Further the Sensor developments have been in the area of "non-nuclear" on-line gauging sensor technologies. Also, the on-line gauging industry has used the power of the PCs in enhancing product visualization displays and process diagnostics. The end result for the Extruder/Laminator is a powerful Process Management tool in improving product quality and production economics.

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Processing

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PET Extrusion Coating - Taking Extrusion Coating to a New Level

Extrusion coating with PE-LD is highly competed area. To make profit it is necessary to head for new areas of extrusion coating. Coating with PET is a good option. This paper will examine the major differences between PE-LD and PET coating. At first we will look through differences in machinery and processing. Main processing challenges will be presented. Also PET coated products and future possibilities will be introduced.

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Packaging

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Reduction of downtime, Quality Improvement and Customer Satisfaction With High Speed Web Inspection Systems

The use of high speed web inspection systems is of vital importance in the field of producing high quality paper. Being able to find defects before converting or delivering products to the end customer, a continuing process of improving the product, reducing downtime and meeting the high expectations of the endcustomer is guaranteed. High-end tools like Data-Mining, Quick Teach and Rewind Manager add to the state-of-the-art high technical standard of ISRA SURFACE VISION´s inspection systems.

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Polymers

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Aqueous Dispersions of Polyolefins

Polyolefins are used extensively in many industries due to a combination of attractive attributes. To date, these attributes can only be incorporated into finished articles through conventional thermoplastic forming processes such as extrusion, thermoforming, injection molding, and blow molding. Polyolefins have not been available for use via low viscosity application techniques due to the difficulty in polymerizing polyolefins, especially polypropylene, in an aqueous environment. To address this gap, a novel process has been developed to disperse conventional polyolefins in water. Dispersions of ethylene and propylene based resins have been produced at scale with high solids content and with submicron particle size. When applied to a substrate, these dispersions combine the typical attributes of polyolefins, namely heat sealability, low temperature flexibility, and water and chemical resistance, with the attributes typical of aqueous systems, adhesion to polar substrates and the ability to accept inorganic fillers. Polyolefin dispersions (PODs) can be applied via traditional low viscosity application techniques including printing operations such as rotogravure. This combination of properties makes these materials ideal for use as a laminating adhesive and as a heat sealable coating.

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A 21st Century Toolbox for Characterizing Next Generation Extrusion Coating Resins

With the constant need by our customers to have extrusion coating resins which process faster and have minimum lot to lot variation Dow Plastics is constantly making improvements in their extrusion coating resin offerings. To aid in this new resin design effort, Dow's Plastics Characterization Laboratory has implemented a 'Breakthrough Characterization' program to develop new tools for our polymer characterization toolbox. In this talk we will highlight several of these new tools and explain how they have aided in developing new extrusion coating resins.

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Specificities of extrusion to design peelable structures for PP, PS, PET and PVC substrates

Extrusion processes are attractive to design multilayers offering heat sealing properties as well as easy peeling properties to typical polymers used for trays and cups like PS, PP, PET and PVC. Whatever the technology used, some tricky issues have to be solved at the processing stage, all related to the stickiness of the sealant top layer : chill roll release, bubble separation after collapsing, blocking, etc. Then, the sealing technology itself has to be considered as it may dramatically squeeze such extruded layers compared to lacquers. Another important point is the effect of the whole multilayer construction on peeling properties, as not only the sealing layer is controlling them. Using different examples, this presentation will discuss these effects and illustrate the possibilities of recently introduced polar ethylene copolymers.

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Printed intelligence in Packaging

Packaging technologies are evolving towards a new era where the traditional packaging functions will be enriched by a variety of new possibilities. Packaging material will represent a new active or interactive functional interface between the customer and the surrounding ambient. The development of printing technologies combined with novel sensor materials and systems allows new business possibilities and have a very promising future. VTT has developed several smart packaging technologies, e.g. printable product quality indicators for food packaging applications. Today, VTT is focusing more and more on research on printed electronics, optoelectronics and intelligent sensors. This presentation outlines the current and future approaches on the development of intelligent systems incorporated in packages. Case studies on e.g. printed diagnostic systems for food packages will be high-lighted.

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Organic, natural pigments as paper coatings.

The technical paper introduces new starch-based pigment coatings on

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paper and paper board. By replacing traditional clay on coatings by organic natural pigments, several enhanced properties can be highlighted; improved gloss, improved printing properties and color strength. The latest studies has brought out the improved adhesion on fibre and on polymer surface. The use of adhesion promoters or even corona treatment can be questionned. The experimental results will be brought into the audience to take them into real products.

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Cast Film Line with a comparison to the Blown Film Process for Barrier Film Production

Above-average growth rates in the field of cast film production and stretch film, PP film and barrier film in particular, have promoted the cast film extrusion process. Manufacturers of extrusion equipment have followed this trend and further developed equipment and processes in terms of quality and output. Being a supplier of blown film and cast film extrusion lines, Windmöller & Hölscher has been asked repeatedly by film producers to present an comparison between the blown and the cast film process for the production of barrier films. So a comparison of both extrusion processes for 9-layer film production is made.

COMMENTS

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Tubular ldPE has the Extrusion Coating future.

Summary The Extrusion Coating market (EC) is still dominated by Autoclave ldPE. As described in the literature this is a consequence of the typical molecular mass distribution (broad + long chain branching) of the autoclave resin, which determines its processability. Some facts: The average age of the European Autoclaves is high (±35 yrs). Forced by European legislation, suppliers are confronted with significant license to operate investments. It is also expected that no new Autoclaves will be built in the future. At the moment no alternative polymers with comparable characteristics are available. Security of supply of a suitable Extrusion Coating resin was the main driver for this SABIC project. The performance should be at least equal to that of the currently applied Autoclave resins and no hard ware modifications at the converters would be accepted. It was noticed that the next generation of EC resins will probably shift towards the molecular mass distribution of Tubular resins. As we know Tubular plants will continue to be built in the future. In addition, from a process prospective the Tubular and Autoclave processes show a high level of similarity. For these reasons the Tubular process was a logical choice. The trajectory and final results of this challenging development project will be presented.

COMMENTS

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Recent Advances in Winding Technology

Winders are an integral part of extrusion lines for manufacturing plastic film whether it be blown film,flat film or laminate.The function of a winder is to store the film or web in such a way that it can be processed and

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Machinery

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utilized without problems.Although winding is an auxialiary opration in an extrusion process,the roll can determine the quality of the product significantly.Wrinkles or air between the rolls translate directly into the product quality.Starting from a survey of the existing winding principles,this paper deals with the latest developments in winding technology leading to the manufacturing of wrinkle free and waste free web rolls.The features of a new orbital pivoting winder which enables low cycle times for a roll change are discussed.Furthermore,practical solutions for commonly occurring winding and slitting problems are treated.

COMMENTS

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An overview of food contact legislation of multilayers

To pack and hold food, multilayers are more and more applied. When materials are brought into contact with food, they must comply with food contact legislation. In Europe certain regulations and directives are applicable. Furthermore, also national legislation can apply. The paper will give an explanation how the raw material suppliers, film producers and the users of multilayer materials should deal with the legislation and how discussions with the controlling agencies or clients can be avoided. Subjects that will be discussed • Introduction to the current EU legislation • Brief summary of the status of some multilayer parts (plastic, adhesives, inks etc) • How to demonstrate compliance • Future developments in the EU legislation

COMMENTS

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Converting

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Technical Paper

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Corona Experiences on Paper and Cardboard

The paper describes different types of corona treatment stations and experiences in treatment results. Innovations in electrode design and knowledge about intensities of corona discharges lead to new results for laminating paper and cardboard with polymers. Additionally the paper shows details about corona treated paper and cardboard with a special view on surface modifications and treatment results.

COMMENTS

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Polymers

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OTHER-explain

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"Beyond the hype - the perspective of the Polyolefin industry on biomass-based and biodegradable polymers."

From trade press conferences to retailers' announcements, "bioplastics" have been capturing headlines and a lot of attention in the plastics industry value chain. Beyond the media and green hype surrounding these materials, the whole industry – from manufacturers to end-users is now taking a closer look at these materials. Building upon a PlasticsEurope and EuPC joint review and giving the perspective of polyolefin producers, the paper will clarify the differences between biomass based, biodegradable or degradable applications and will review the opportunities these materials are opening, as well as issues they are raising, for the plastics industry.

COMMENTS

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New Developments in Plexar® Tie-Layer Adhesives

Plexar® tie-layer resins were the first tie-layer adhesives developed in North America. These products are tailored for targeted applications and processes, and are designed to give controlled adhesion at the interface in multi-layer co-extruded structures. Typical structures include a barrier layer, such as ethylene vinyl alcohol (EVOH) or polyamide, and a polyolefin, such as polyethylene or polypropylene. Other structures include polystyrene, high-impact polystyrene, or their combinations. This paper is aimed at introducing new high-performance tie-layer adhesives. Performance is studied in several extrusion processes and in different applications. Applications cover a wide range of uses, including food packaging, metal lamination, multi-layer pipe and wire and cable. The new adhesives are designed to give improved adhesion, while maintaining high clarity in multi-layer barrier applications. In highly demanding applications, such as orientation and thermoforming, the new adhesives were designed to dissipate the interfacial stresses in order to maintain high bond strength. Correlation between macro-scale performance and molecular structure was accomplished using newly developed analytical techniques.

COMMENTS

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Extrusion

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Optimisation of multi layer extrusion die flow by varying slip, using visco-elastic simulations

During extrusion coating of a PET coating, the layer-to-layer distribution varies. In this article the extrusion die is simulated visco-elastic to identify instabilities. The coathanger and preland are simulated separately, to investigate the stability of and effect on the flow. From practice it was established that slip must be applied to receive realistic results from the simulations. Based on literature and rheometer data, a slip model was chosen and the simulation was verified with practice.

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Processing

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Technical Paper

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Industrial inline control for advanced vacuum coating roll to roll systems

Production for the future FED (Flexible Electronic Devises) and security markets must begin to take advantage of roll to roll coating. To guarantee high productivity and quality inline control for layer properties are needed. This paper presents resistance, spectrometric and a new ellipsometric inline measuring methods in various vacuum coating systems. Selected examples as copy protect layers by color shift and high barrier layers for FED in the application range of Solar and OLED will be shown.

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The Use of Metallocene Polyethylene in Co-extruded Lamination Films

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Polymers

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The value of metallocene LLDPE compared with other polyethylene's (e.g. LDPE, C4-LLDPE etc) has been examined in 3-layer co-extruded lamination film formulations, with particular focus on competitive sealant polymers such as C8-LLDPEs. The examination demonstrated that films formulated with metallocene LLDPE imparted significantly better sealing properties compared with other polymers, resulting in significant improvements in packaging line speed. This presentation illustrates the comparative results and the conclusions drawn from them.

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Extrusion

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Technical Paper

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New developments in biopolymers for film extrusion

There has been concern for some time about the amount of plastic waste in the environment and for this reason alternative raw materials that are biodegradeable have been researched for many years. There are now biodegradeable resins on the market that can be extruded into high quality technical films such as stretch and masking films. Extrusion equipment manufacturers are working closely with the resin producers to make full use of this development

COMMENTS

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Category:
Polymers

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Status:
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What can happen to polymer granules from the supplier's silo to the extruder hopper?

In the production of polymers QA systems are perfectly in operation to guarantee the agreed properties and performance of the granules. On converters side there are also QA system to reach the necessary quality level in the extrusion coating process and further. So this study will focus on the journey of the granules on the way from the producer silo to the extruder hopper, where some dust, fines, angel hair, etc. can be created. Some examples will explain how it can be reached that the extruder hopper is only filled up with granules and no trouble makers.

COMMENTS

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Processing

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Status:
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Improved process performance of flat dies by a much wider die gap operation window and a new surface finish of the die body.

Converters have with LDPE good extrusion coating results. When polymers like HDPE or PP come in the game, the processing conditions have to be adapted. As die surface and die land geometry is a given fact, only the mechanical pre adjustment of the die gap can be slightly modified. By implementing of a second temperature controlled bolt system, the basic die gap can be adjusted and the normal die bolts are responsible for the well known cross profile control. This study will describe the influence of this system in combination with a new die body surface finish.

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Converting

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Adhesion to Foil – More than Just a One-Sided Story

Aluminium foil is widely accepted as the best barrier material in flexible packaging, even in the face of many new up-and-coming high-barrier materials. Besides high thermal conductivity to give enhanced converting and sealing performance, other key criteria which distinguish "converter foil" from competing materials are its outstanding wettability and robust bonding to a wide range of lacquers, adhesives and coatings. This presentation aims to provide a fundamental understanding of how adhesion to aluminium foil works from a foil maker's practical point of view. Adhesion and adhesion failure in different aluminium-plastic laminates during converting and further packaging processing, as well as a result of interaction with filled goods, are described using everyday cases. The principles and rules for ensuring sufficient and robust adhesion are derived from these typical examples.

COMMENTS

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Converting

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Technical Paper

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Transparent high barrier laminates manufactured by extrusion lamination process

High barrier packaging laminates usually are produced by adhesive lamination technology, either solvent based or solvent free. Both technologies are based on isocyanate chemistry, witch usually gives excellent bond values in the laminate. However these systems also show severe disadvantages as they need long curing time, in aromatic systems they can develop toxic primary amines and in case of solvent based systems the application releases significant amounts of VOC. An alternative to the adhesive technology is the extrusion lamination. Instead of using PUR adhesives, melted polymer is used to laminate the substrates. This technology is already widely used in chips (crisp) packaging, but the application in transparent high barrier packaging production is still very limited. The presentation will therefore focus on materials and technology applicable for the production of transparent high barrier structures by extrusion lamination, a new way of ecological sound production.

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Technical Paper

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Cold atmospheric plasma technology for surface pretreatment and coating

Recent developments in the field of atmospheric plasma technology are creating new perspectives beyond current state-of-the art in corona pretreatment of materials. By controlling the gas atmosphere and electrical conditions, one can increase the efficiency of the plasma surface treatment significantly. Furthermore, by adding reactive chemical precursors to the plasma discharge, the surface chemistry can be controlled and thin functional coatings can be deposited.

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Extrusion Lamination and – Coating in flexible Packaging Applications

Flexible packaging appears to be more and more convenient in all areas of daily life. Also in special areas like medical, pharmaceutical and

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Converting

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Technical Paper

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technical packaging you can see a lot of goods packed in flexible laminates. Especially in those critical areas where sensitive goods like food, pharmaceuticals or chemicals are in direct contact with the packaging material, inertness and food or pharmaceutical certificates are getting more and more important. At the same time an upgrading of the requirements for the packaging materials regarding barrier and seam integrity, which have direct influence on protection and durability of the packed goods take place and extra requirements like peel ability and direct printability on the primary packaging materials are coming along. A good portion of these requirements can be fulfilled by using coextrusion-lamination and coating of web-based raw materials (paper, polymer films, aluminium foils and non-wovens) with a combination of different polyolefinic (co-)polymers. The multiple variability of the single layers which itself are optimised on a very special duty (adhesion promotion, barrier, sealing etc.) inside the multilayer laminate are the main advantages of these processes. The main basic advantages are the very good chemical inertness and resistance, high purity (no migrating, no low molecular weight ingredients) as well as the easy process ability (also at high production speed until 600 m/min) of the numerous polymers adapted to these kind of casting process. Coextruded polymer layers offer significant higher barrier compared with glue laminated products due to the multiple surface interfaces in combination with the higher barrier of the polymers itself. Easy dosable master-batches allow additional variations, like easy slip (low COF) or good release, which can be of high importance for the packaging process of the laminate. Continuous improvement of processes and raw materials is essential to fulfil all requirements of the market as good as possible. A few typical examples out of the ongoing developments will show the current trends and the technical options to achieve maximum result = properties with minimum weight or costs of the so produced flexible multilayer laminates.

COMMENTS

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7720

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Packaging

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Technical Paper

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The new challenge for the flexible packaging industry - laminates in South-East Asia and China?

The economies in Asia continue to grow strongly. Five, eight, twelve-per-cent growth and more - nothing seems impossible. Accordingly, the packaging sector also exhibits extraordinary growth rates, reflecting the population's rising standard of living. Flexible packaging is the now preferred choice for many food, healthcare and personal care packaging applications. There are, however, certain differences and preferences compared to European specifications. These characteristics will be explained with typical examples from the various markets.

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Processing

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Technical Paper

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Gravure coating technologie and its ability to reduce cost and “MUDA” waste.

The presentations gives an overview about the different gravure coating technologies and their applications. Further more it helps to understand how this process can support the initiatives to reduce MUDA such as downtime for cleaning and setup. The presentation will follow up on the possibility to reduce material cost by exchanging for example an extrusion process with an coating process. The benefit could end up in lower cost for the Material in the production process.

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Processing

Session:
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A comparison of different unwind and splice systems

This presentation will tackle following topics: •Type of unwinders selection depends on requirements of speed and web materials. •Position of splicer systems to guarantee splices up to high speeds. •Reduce tail length and waste material on the core is significantly requirement for the process an market •Theoretical calculation of tail length, and opportunities for improvement. •Necessary drives depending on different sensitive web material •Specific features due to optimize the possibility to adapt any automatic reel handling •Geometrical dependences in the Unwinder for different web material and consequences. •Material specific manner and effects for the design issues on Unwind and Splicer •Future direction to reliable butt splice without festoon for various kinds of web materials and speeds

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Processing

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Technical Paper

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Die Lip Geometry and its Impact to the Neck In

A great deal of theory has been presented on neck in and edge bead reduction for extrusion coating dies, with little data to support such theories. An examination of the relationship between polymer properties, melt flow path, and die design will be presented. Empirical data will be provided to correlate coating results with die design criteria.

COMMENTS

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Processing

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Real-time and in-line Optical Monitoring of Functional Nano-Layer Deposition on Flexible Polymeric Substrates

The roll-to-roll (r2r) deposition of functional nanolayers onto flexible polymeric substrates has attracted a huge interest, since it will lead to the large scale production of multifunctional material systems. These include encapsulation materials (ultra barrier layers), transparent conductive oxide (TCO) electrodes and low cost semiconducting organic layers for flexible electronic devices (FEDs) such as flexible OLEDs and OPVs. The properties of such nano-coatings are determined and controlled by the bonding structure and adhesion film-substrate, the surface nanostructure and chemistry and of the subsequent functional layers. Therefore, the accurate determination of the optical properties by real-time and in-situ optical sensing techniques and the correlation to the final properties are of essential importance. In this work an introduction is given on in-situ and real-time Spectroscopic Ellipsometry (SE) at a spectral region, from IR to Vis-fUV, in combination with advanced modeling and analysis techniques, as a preferred method to meet these challenges.

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Category:
Processing

Additives for polyolefins: chemistry involved and innovative effects

Because many synthetic resins suffer from photo degradation, the investigation of ways to inhibit or at least retard this type of degradation has been a major effort to the industry. Hindered amine light stabilizers (HALS) represent the most important development in light stabilization

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for many polymers, and in this presentation an overview of stabilization fundamentals will be provided together with some recent advances in this field. Performance data reported will show the benefit in using HALS as light stabilizing systems for plastic. The presentation will end with new directions into new additive technology that allows shelf-stable plastic packaging of oxygen sensitive ingredients and potential for extended shelf-life.

COMMENTS

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Products

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Technical Paper

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The Basics of the United States Food and Drug Administration¡¦s Regulations of Food Contact Materials

Mr. Ettinger¡¦s presentation will focus on the U.S. legal and regulatory aspects of food contact materials under the laws and regulations of the U.S. Food and Drug Administration (FDA). Some of the topics that will be addressed include: --Why are food contact materials regulated by FDA? --How does FDA regulate food contact materials? --When do companies have to go to FDA to market their food-contact materials? --How can companies save time and money and market their food contact materials without going to FDA?

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Packaging

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Technical Paper

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Advances in airtight paperboard packaging

Airtight packages based on the use of paperboard offer several benefits from improved product safety and prolonged shelf-life to the branding opportunities offered by the printing and converting capabilities and the environmental goodwill. Development of the concept requires strong expertise in substrate materials, barrier coating options and production, filling and tightness testing technology. Stora Enso has brought on the market an airtight paperboard package for dry foods, which was achieved through a combination of specially developed non-foil paperboard, optimized heat-sealing, raw-edge protection and innovative lid sealing. The water-vapor barrier of the material protects the contents against caking, loss of crispiness, mold growth, softening of texture and change in color, taste and odor. Oxygen barrier protects the packaged food against rancidity, loss of vitamins, growth of microbes, oxidation of lipids and change in color, taste and odor. The package is suitable for snacks, cereals, confectionery, biscuits, tea and regular and instant coffee, for example.

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