

TRIALLING ADHESIVES AND COATINGS FOR OPTIMUM PRODUCT DEVELOPMENT/PERFORMANCE

Release Date: January 8, 2008

Coatings and adhesives play an increasingly important role in many aspects of 21st century life. For instance, manufacturers and design engineers are constantly on the look out for ways to improve the appearance and performance of their products – they know that consumers desire sleeker, quieter and more durable items. Marketers also know consumers want products that look distinctive and meet expectations. Advances in coating systems, in adhesives and in applicator systems provide a wealth of possibilities for the design engineer and manufacturer to improve on product form and function. In the adhesive field for example, pressure sensitive tapes are used to dampen noise and vibration and for bonding to new low-surface energy substrates – the type typically used to protect electronics. Pressure sensitive tapes can provide a product with a more attractive finish, one free from the raised surface and imperfections caused by rivets and other mechanical fasteners.

Pressure sensitive adhesives, curing adhesives, hot melts, natural rubber latex adhesives, and others are indispensable in applications such as packaging. For example, natural rubber lattices, formulated with acrylic resins are used in the preparation of cold-seal adhesives, which are then employed in package wrapping of heat sensitive foods such as chocolate. Tom Kerchiss, Managing Director of sample preparation and coating system technology specialist RK Print Coat Instruments says that without the varied and on-going advances in adhesives and coatings for packaging, food items couldn't be stored in a chiller or freezer. Mass produced products equally couldn't be cost effectively labelled.

Innovative adhesives continue to be developed, adapted or refined. For example, natural rosin, obtained from conifers was the first hot melt. Although still in use as a single component, if formulated with ethylenevinyl acetate (EVA) co-polymer the cohesion of the melt is enhanced making it suitable for glass jar and can labelling. Other types of hot melts include the pressure sensitive hot melts based on thermoplastic rubbers, polyamide hot melts and polyester hot melts.

Pressure sensitive adhesive tapes find widespread acceptance in packaging, from the ubiquitous carton sealing tape to those engineered for high tech applications. The oldest tapes, masking, duct and electrician tape may be supplied without a liner; other, such as the transfer tape, do not have a carrier membrane, as a result the adhesive is extensible and more conformable. With only one layer of adhesive, the tape can be relatively thin. Then there is the double-sided tape, incorporating a release liner. Typically ease of release is determined by a silicone coating that prevents the adhesive from forming a strong bond with the release liner. Some bond is necessary to keep the liner from falling off the tape until it needs to be removed. The composition and coat weight of the release determines the ease of removal.

The advances made in chemical formulations have been matched by equipment such as production coaters, which in the case of hot melts can run at speeds of up to 500 metres per minute. Nevertheless, many product runs are of a short run nature and are specialised. Adhesive formulations, liners and other materials also need to be tested to ensure fail-free performance.

Furthermore, successful product development whether by packaging technologists or product designers is dependent upon resolving component compatibility issues, developing products with components that make mass production commercially profitable, and/or contribute to overall product functionality (in the case of coatings this may be to provide barrier resistance; to prevent the egress of gases, moisture and light).

Two systems, the Rotary Koater and VCM assist companies in developing new products and in resolving the various issues surrounding production. The Rotary Koater, employed worldwide by

major manufacturers of products and consumables, as well as by chemical, ink and adhesive producers, converters and many others is a multi-tasking pilot printing, coating and laminating machine, available as either a single or two-station machine. It consists generally of a bench mounted space frame onto which are fitted various printing heads, web handling equipment as well as drying/curing units.

Tom Kerchiss is at pains to point out that the flexibility of the Rotary Koater; the ease of interchange ability of coating units and printing heads make this system ideal for those converters, R & D departments and formulators with daily changing requirements. The system is also used for small-scale production, often of specialised materials or for product/component evaluation.

Many customers, some of whom purchased the Rotary Koater in the past, now have known print/coating/drying needs. For this type of customers the VCM (Versatile Converting Machine) concept is an attractive option.

Built to order each and every VCM is designed and constructed using state of the art components and is engineered to tight tolerances. Customers have the option of choosing from more than 15 different types of coating and printing systems, with drying options ranging from hot air, infra-red or UV curing. Different web path configurations are available and RK Print Coat Instruments VCM can be made explosion proof, configured for clean room operation and fitted with corona treater or other operational critical components. Coating technologies include hot melt extrusion, knife-over-roll, reverse roll, slot die and meter bar; print options include flexography, gravure, gravure-offset and rotary screen.

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