Resins technologies adapt to the needs of lamination adhesive manufacturers

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This article has been prepared by MICHAEL HERSON of London-based The Strategy Works – a strategic marketing consultancy specialising in original business to business research within the European chemicals sector.

To research this article *The Strategy Works* interviewed the world's leading four manufacturers of lamination adhesives – *Henkel, Rohm and Haas, Bostik* and *Coim* who were originally interviewed three years ago, for an earlier article published in FLEXO & GRAVURE INT'L (1-2006, p. 56). This paper seeks to understand the driving forces behind the use of resins within lamination adhesives, and the factors shaping customer demand – both legislative and commercial.

Backwards integration

All manufacturers, with the exception of *Henkel*, are backwards integrated in terms of the resins chemistry which is used in the manufacture of lamination adhesives. GED SWEENEY, Technical Service Manager Australia and New Zealand, describes *Rohm and Haas* as »an acrylic powerhouse«, who manufactures acrylic polymer from acrylic monomer for a wide variety of end-uses. Adhesives and sealants contribute approximately 10% to the annual turnover of *Rohm and Haas*.

Within the total market structure, Polyurethane dominates with solvent-free being the key product type. This is confirmed by Dr HANS-GEORG KINZELMANN, Corporate Director Flexible Packaging for *Henkel*. »Lamination adhesives from *Henkel* are based, to a large extent, on PU-adhesives. The Polyurethane chemistry has also further developed; it depends on the final application. For example a potato-chip-bag needs less adhesive force than standup pouches for cat food, which still must endure sterilization.«

BRUNO ROCCHETTI, General Manager GBU Flexible Lamination at *Bostik* confirms the source of the chemistry »Yes, we buy monomers and we make prepolymers – I would say we use commodities to make a speciality product«.

This is endorsed by TERRY SADLER, General Manager of *Coim UK* »For the vast majority of our adhesives, we manufacture the polymers from raw materials. For most of our polyesters and polyurethanes we have become totally self-sufficient«.

Market size

The consensus is that the European market size is estimated to be 70,000 tonnes a year, for lamination adhesive applications. None of the manufacturers expect growth within Western Europe or North America; only in Asia and China where new converting capacity is being built as consumer eating habits change.

External legislative factors

The EU and FDA guidelines form the key global framework with REACH being the most recent current legislation to affect European producers. Adhesives are normally in indirect contact with food so migration levels and positive lists are the key legislative parameters for resin manufacturers.

UV and water-based substituting for solvent-based

UV would appear to have issues in food applications and the consensus is that it is not substituting solvent-based within lamination markets. Clearly water-based is substituting some solvent-based applications but, at a limited level, driven mainly by *Rohm and Haas*. It is not a major trend in Europe and is more evident in USA.

This is confirmed by *Henkel*. Dr. KINZELMANN reports that in Europe solvent represents 45% of the market, solvent-free 50% and water-based systems around 5%. »Solvent-based adhesives are typically used for higher demanding applications where solvent free and especially water-based systems have technical limitations.«

Bostik confirms that solvent-free is the preferred choice and is taking share from solvent-based in Europe. It is cheaper than water-based and consumes less energy in drying. Another disadvantage of water-based is it requires new equipment with dual capability so it is really only viable if the converter is replacing or updating machinery.

Coim agrees that solvent-free is the key market mover and it is unlikely that water-based is more than 5–10% of the market at most. According to BRUNO ROCCHETTI »Solvent use will reduce further and an elimination of isocyanates and ultimately no solvents is the trend«.

Primary amines

GED SWEENEY points out it is necessary to avoid the primary aromatic amines (PAA) which are potentially

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carcinogens, but once the adhesive is fully cured that is not a problem. PAA may form as a result of reaction between free isocyanate in the adhesive and moisture. He explains that this can be even more of a problem with solvent-free and *Rohm and Haas* »have come at this in two ways« with their water-based *Robond L* acrylic system and their solvent-free *ELM* adhesives. The latter is a product containing extremely low levels of monomer, explains Sweeney. »The potential for forming primary aromatic amines is massively reduced, which means you are compliant a lot quicker than you are with standard solvent-free systems.«

John England, Technical Manager Coatings and Graphic Arts *Coim Germany*, confirms the aromatic amines issue: »They're sort of generated; they are there in the adhesive, but when you put the adhesive in a laminate and you put food into the laminate, there's an interaction between the food going through the sealant layer, interacting with the adhesive, which in the wrong circumstances, can cause aromatic amines to transfer from the adhesive into the food«.

Legislation vs cost as key market drivers

The four companies are split between the two main driving forces: *Bostik* feels that legislation is the main driver as does *Rohm and Haas*. »Ultimately it is legislation because you can't provide the cheapest product in the world if it doesn't comply« according to Ged Sweeney, whereas *Coim* and *Henkel* believe that cost is the key driver. »Cost dominates more than the legislation« according to Jan Gäthke (Head of Purchasing Raw Materials Germany Adhesives Technologies) at *Henkel*; and John England of *Coim* agrees, »it's 70% cost and 30% legislation«.

From a marketing standpoint, the consensus is that the retailers are more a driver of change than the converters themselves.

Renewables and compostables

Renewables are being used by some manufacturers but their potential is limited and is not really underpinned by any real customer demand. Bruno Rocchetti points out that renewability and compostability are distinct in that you can bring together a compostable packaging with synthetic and you can be non-compostable with renewable which are »two different trends«.

Resins properties

The two most valued resins properties are low solvent retention (linked to food tainting) and faster drying and curing; the latter driven by cost efficient production in order to increase throughput for the converters. Jean-Francois Le Cam, Global Product and Marketing Manager GBU Flexible Lamination, *Bostik*, confirms that »it is the biggest driver of demand in the market«.

The curing speed has a major impact on the need to store product prior to use which, if improved, would reduce the need for long storage times and high inventories. Resins that improve these characteristics could potentially create a strong position in the market place.

Conclusion

The supply of resins within the lamination adhesives sector looks likely to continue to be dominated by cost and legislative factors in equal measure. Demand for innovation will continue from retailers, but it is not the main driving force, as converters seek to reduce their manufacturing costs, rationalise their supplier base and achieve compliance.

- ➜ *www.bostik.com*
- ➜ *www.coimgroup.com*
- ➜ *www.henkel.com*
- ➜ *www.rohmandhaas.com*

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